COMMODORE user

COMPUNET V MICRONET

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WIN ANKH—THE THINKERS GAME

EDUCATION SOFTWARE SURVEY

Assembler Test Runs

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- easy handling of multi-coloured sprites
- overlays of up to seven layers

User-friendly Go-Sprite can be operated almost entirely by joystick alone. Lightpen and keyboard control options also included. Speedy loading program. £9.95

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Commodore Corner

Commodore bug-wigs must be glowing with pride and joy (rather like a Miss World or European Song Contest winner) because their very own pride and joy, the Commodore 64, has just been voted Home Computer of the Year for the second year running. Voted by whom, you may ask?

Judging was done by seven international computing magazines, from the UK, Germany, Italy, France, the Netherlands and the USA None of them, by the way were Commodore 'dedicated' magazines. That spurred Commodore on to make the claim that the 64 is currently the best-selling home computer in the world – a true rags to riches story?

Meanwhile, Commodore's latest machine the Plus/4, is in for some heavy promotion. Computer hardware retailers the Spectrum Group has organised a competition in conjunction with Commodore to promote what's intended to be the 64's big brother

What do you do? Well, just pick up a leaflet from any Spectrum store and enter the not very original competition to place six of the Plus/4's attributes in order of merit Funnily enough, the prize in both is software (the facility most people though Commodore was plugging) doesn't even get a mention

The winner (and three friends) gets a seven night holiday in Florida, squeezing in Disney World and the Kennedy Space Centre You'll also get a holdall full of money (£2,500) to spend Ten runners up get £100 gift vouchers. Funny, nobody won a Plus/4 You'll have to hurry, though, closing date is December 31st

New Year's games

64 owners are in for the cream of the new games launches for Christmas and the New Year

Once are the days when a top game appeared on the Spectrum first and was converted to the Commodore months later.

With the latest market research from Gallup showing Commodore neck and neck with Sinclair in terms of machines sold, many of the software houses are targeting their products unambiguously for both systems.

Commodore owners can

further privileged in that they can choose from the wealth of excellent Commodore software being imported from America by the likes of US Gold, Statesoft, Ariolasoft and Beyond.

Most exciting of the games on the US pipeline is Conan from Datasoft. The game is officially licensed from Lucas films and will challenge the muscle-bound star of comics and films to fight his way through seven progressively difficult games screens

Action takes place in a castle chamber where flame monsters and flying dragons must be slayn by Conan with his mighty sword if he is to win immortality

Beating Conan in to the shops will be another hero of the big screen – Indiana Jones.

Indy's game is not based on any one of the films in particular but features a number of swashbuckling challenges typical of the screen adventures. These is an added challenge in Indiana Jones as the player has to work out what the objective of the game is as there are no specific instructions

Indiana Jones and Conan will be the first launches in a new series of imports from US Gold entitled Famous Names The games will be in the normal US Gold price range – £9.95 for cassette and between £12.95 and £14.95 for disk

Conan is not expected to be in the shops until late January Other titles appearing on the Famous Names label will be a

new racing car game from Coram that US Cold are hoping will be endorsed by Nicki Lauda.

Stuntman Lee Majors jumps onto the picture with the latest game from Elite – based on the TV show the Fall Guy The player can take part in a number of dangerous stunts including tram-walking and being whisked off the top of a burning skyscraper by helicopter

Spectrum game kings Ultimate are launching their first Commodore game for Christmas with Jet Pac – a game that challenges you to assemble a rocket, fuel it, and blast off to another planet Also hoping to double the revenue from their Spectrum titles with Commodore conversions are Beyond Software who will launch Lords of Midnight and Doomdark's Revenge for the 64 in the New Year

Mosaic are attacking the Christmas market with three new game book adventures The Saga of Erik the Viking, The Nomad of Time, and The Stainless Steel Rat Saves the World get the computer game treatment

Still no sign of the Great Space Race from Legend, the long awaited sequel to Valhalla. The one could call just steal the show before Christmas although it will be hard pressed by Ariolasoft who are launching the entire Electronics Arts range of US prices

One thing is certain – Commodore owners with a bit of spare cash to spend on software in the New Year will have dozens of good games to choose from.

ANKH Competition

Ankh is a unique puzzling graphic adventure from Beyond. ~~~~~~~~~~~~~~~ use and but invites you to ~~~~~~~~~~ your Mindprobe through a series of challenges.

These are treasure to be collected along the way; look, which may, help you out in awkward ~~~~~~~ clues which can distract you or determine your next course of action.

Gradually the challenges build up as you battle through each problem, firing of keypads to open doors, probing the walls for new discoveries and learning to manipulate the word of Ankh. We have 25 copies of ~~~~~~ set out below.

A		Keypad to operate orange doors
B		Keypad to operate yellow doors
C		Keypad to operate red door
D		Control to move shadow probe right (once only)
E		Control to halt shadow probe (once only)
F		Control to fire from bottom of shadow probe (once only)
G		Downwards firing cannon
H		Right firing cannon
I		Upwards firing cannon
J		Left firing cannon
		Shadow probe
		Mindprobe

In the theatre world of Ankh, sliding doors are activated by keypads which work when they are lined on. Strange cameras divert fire in different directions, controls move the ghostly Shadow probes around duplicating your Mindprobe's activities.

There is much more to the bewildering puzzles found in the 64 rooms of Ankh but here we have based a competition on just the elements mentioned above.

We have defined a room consisting of several corridors with the way out being shown by the red door. The objective is to escape through the corridor beyond the red door but that you must open it and the keypad is not the most accessible.

Each keypad ~~~~~~~~~ corresponds to the doors of the same colour. So the yellow keypad will operate every yellow door on the layout each time it is tried.

The doors slide back in the direction of this arrow and they block another passage by doing so.

The blue shadow probe can move and fire just as your own can but it must be

stopped before it can fire. A move of the third of the pace of your Mindprobe.

The controls for operating it are shown in red and will explode when they are fired once so they can be used once each

Control 1 – Moves the shadow probe to the right

Control 2 – Stops the shadow probe

Control 3 – Makes it fire downwards

Remember each can only be used once.
For the purposes of this game the only things you can grab upare the blue cannons.

These divert your fire in the direction they are facing. So if you fire at the right facing cannon – from whichever direction, it will divert the bullet to the right.

You may only pick up and hold one item at a time by simply moving it and it doesn't hamper movement. But the probe cannot go through impossible gaps and only fires in straight lines. To enter left in the coupon below. It can be done easily in under 20 pages. Use phrases like "Fire at A, Explode B, Pick up G, Put down G at X on layout" (placean "X" on the layout).

We will lay aside to see from your order whether you have mastered the solution hot or hot.

ORDER OF MOVES

Move 1	
Move 2	
Move 3	
Move 4	
Move 5	
Move 6	
Move 7	
Move 8	
Move 9	
Move 10	
Move 11	
Move 12	
Move 13	
Move 14	
Move 15	
Move 16	
Move 17	
Move 18	
Move 19	
Move 20	

Remember to keep a close check on the doors and where they are.

The first 25 correct entries will win a copy of Ankh

NAME

ADDRESS

SEND ENTRIES TO ANKH COMPETITION, COMMODORE USER, 30-32 FARRINGDON LANE, LONDON EC1R 3AU

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News

Jansen interface

There's now a supermarket trolleyful of printer interfaces available for the Commodore 64 ranging from cheap offerings that need RAM-based software to drive them and offer few facilities, to the expensive 'intelligent' interfaces which do almost everything but boil a kettle. The new Print - 64 device from German-based Jansen Electronik, costs £65 and falls into the latter category.

It's a Centronics interface that connects to the 64's serial port No extra software is needed as the device has its own processor, 8K of RAM acting as a buffer and an EPROM chip. It's especially adapted to drive 9 by 9 dot matrix printer like the Epson or Star machines, so you could achieve print speeds up to 180 characters per second.

As expected, the device will print the complete Commodore

character set both normal and inverted. Hi-res screen dumps can also be taken in four sizes. Those can be normal or inverted. Pictures may be created with a 'paint' package can be damped to the printer, too, though obviously not in colour. The device compensated for that by selecting a different shade of grey for each of the sixteen colours

But to do that, you'll need to use special commands on the floppy disk supplied (a cassette version should soon be available). That disk also contains a tutorial, compensated by a list of secondary addresses on the device's outer casing The device is available now on mail-order direct from Germany. More details from Jansen Electronik, 5090 Leverkusen Str, Unter Olbach 1, Germany

Do you spend many hours typing in numeric data into your Vic or Commodore 64? If you find the conventional Commodore keyboard a chore, the Commercial Products numeric keypad may be just the thing for you. It costs £29.95 and connects in parallel with the keyboard, using no extra software It features numeric keys, a point and a Return key. More details on 0293 545791

The long awaited sequel to Andy Spencer's enormously successful International Soccer cartridge is on its way Sources inside Commodore tell us that the game is now in the fine tuning stage.
Its graphics are every bit as sensational as the football game's were, with cheering crowds, adverts on the stadium hoardings, and authentic movement of the ball.
The Commodore Soccer game was the most successful game ever produced by Commodore themselves - most of the bits coming from third party independents.
As well as the basketball game there are also rumours of a follow up to the first soccer cartridge - International Soccer II.
The basketball game is also thought to be produced on cartridge and will have a price tag of £8.95.

Books go soft

It's not news that book publishers are foraging a trail into the the computer software market. But most of them have, so far, produced only educational software for children. Now, Blandford publishers is producing a range of software for the Commodore 64 that complements some of the best-selling titles - of course, you get the book with the tape

The packages, according to Blandford sales director, Chris Lloyd, are designed for people who require "a more serious application relating to his or her leisure and domestic activities, the tape enables you to make better use of the book" So what's Blandford offering?

First there's Janet Graham's Dave Stewart's Introducing the Dots book, which teaches you how to read, write and arrange music The process is now complemented by the accompanying tape From there's Plan and Design Your Garden, for which the program allows you some on-screen planning

The Production Birthday File package contains the Production

Book of Astrology and a tape that lets you keep tabs on birthdays and astrological dates

If your stars are more romantically inclined, there's The Love Oracle package which contains Guy Damian Knight's book The I Ching In Love Apparently, this has something to do with predicting questions of love, relationships and marriage Each book-and-tape package costs £14.95. More details on 0202 671171.

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COMMODORE USER

Fast loading by Novaload

Pretty Basic stuff

Following on the wake of Simon, BC and David comes Breden's Basic from Visions Software Factory. Described by its progenitors as 'the most comprehensive Basic available yet for the Commodore 64', here's a quick roundup of facilities offered.

The program has 135 commands running in 8K of RAM including hi-res colour graphics, structured programming techniques, multi-colour graphics, user-defined characters, music, sound synthesis and toolkit facilities.

The program comes in a library case and is well documented with a large and well-designed manual. Still, at just over £24, it doesn't come cheap. Sensibly Visions has packaged up both a tape and a disk so you can upgrade to a disk drive without having to throw the whole lot away. We're putting it on our future review list.

Visions
BREDEN'S BASIC

Crib card: Phoenix Publishing has produced what it calls a 'Crib Card' for the Commodore 64. The card folds up rather like a map and contains a wealth of reference information that should save you ploughing through the *Programmer's Reference Guide*. There's a section on Basic which includes syntax conventions functions, commands and examples of how to structure Basic statements Then there's the 64's character set, a default memory map, colour and control codes, SID and VIC chip registers, error messages – and a whole lot more All that for £1 99

New man at Commodore: Commodore has appointed a certain David Gerard as its new UK Marketing Manager, the aforementioned having marketed telephones and calculators before joining the great Commodore empire "1985 will be marked as the year that Commodore broadened its horizons", opines Gerard. What horizons would they be? Well, to regain Commodore's "historic dominance" in the business market. With still no imminent appearance of the much publicised Commodore PC and Z8000 machines, Gerard will have his work cut out

End of the Masquerade: Haresoft has now released the second and final part of its Haretraiser game Called Haretraiser-Finale, it will also help you solve the first puzzle, putting you well on the road to winning the Golden Jewelled Hare. For £30,000. Haresoft reckons the winner will have a difficult decision whether to go for the money or the Golden Hare – we wait with baited breath.

Turbo on disk: Supersoft has developed a turbo loading utility which claims to speed up loading times from a 1541 disk drive by around three times It's been incorporated into Supersoft's new Bancalc-3 spreadsheet Don't worry if you've bought the slowish version, the company is offering a free upgrade More details on. 01-861 1166.

First for books: book lovers will remember that we reviewed two rather good books for the Commodore 64 from US publisher Abacus in the October issue The range of four titles is now available from First Publishing in this country at a cheaper price *The Anatomy of the 64* (£10.95), *Anatomy of the 1541 Disk Drive* (£10.95), *Tricks and Tips for the 64* (£10.95) and *The Commodore 64 Machine Language Book* (£8.95).

Learning to truck

Applied Systems Knowledge (ASK) the accomplished education software house which wrote Face Maker (amongst others) for Commodore and has written a large stack of educational programs for the BBC and Electron machines, has now released a game under its own name for the Commodore 64

Called Time Trucker, it aims to help 8-14 year old children understand the relationship between the twelve-hour analogue clock (the one with the hands) and the 24-hour digital types.

It also explores the relationship between distance and time by getting you to drive a delivery truck, keeping to your time schedule and working out the best route – oh, and there's the inevitable road repairs to watch out for With a little skill, you might become the Super Trucker

The game comes on cassette, costs £7 95 and includes what looks like a useful twelve-page pamphlet. Unlike most educational games on tape, this one features Novaload so you're up and trucking in just over two minutes.

Letter from America

The soft side of the States

Dan Gutman reports

Last month, Dan Gutman made us all drool by telling us about the new American Commodore-orientated hardware we can't buy across our end of the Atlantic. This month, he's rounded up some unusual US software. Do you like playing with frogs?

I had the chance to meet your own Douglas Adams the other day. He was in New York for the introduction of the Hitchhikers Guide To The Galaxy, the interactive novel Infocom is distributing it in computer stores and publishing heavyweight Simon & Schuster is shipping it into book stores. It's very exciting. This is the first time a "name" author has written an interactive book. I think it ushers in a new age of literature, the same way The Jazz Singer revolutionised the movies.

Adams isn't the only author who has gone interactive. Trillium Software (which is really Spinnaker Software) has signed big name writers Ray Bradbury (The Martian Chronicles), Arthur C Clarke (2001: A Space Odyssey), Robert Heinlein (Stranger in a Strange Land), and Michael Crichton (The Andromeda Strain) to turn some of their books into graphic adventure games.

Bradbury's Fahrenheit 451 is already out for the Commodore, and I like it a lot. The game starts with you waking up near a pond at Central Park and that's just a few blocks from where I live. Home of the Trillium games have the depth of Infocom's all-text adventures, but they do have pictures, and that's important for some people. You can bet that the other big name authors will be going interactive too.

The other day I asked Douglas Adams that question and he replied, "Absolutely not. When radio came out, everybody said books would disappear. When television came out, everyone said radio will disappear. People fed new ways of enjoying themselves. But there's something about the experience of reading a book which nothing else will

replace. You can't take a computer game on the train."

Frogge: falls apart

Probably the most outrageous piece of software ever has just come out for the Commodore Operation Frog, by Scholastic. It lets you do a simulated frog dissection! Those days of hacking up live frogs in biology class may be over now that we can do it on-screen. No blood, no mess.

You use the joystick or keyboard to move 33 internal organs (including everybody's favorite the gall bladder) and the computer tells you about each one It's fun, educational, and there's something definitely warped about it.

The best part is that you can do something no scientist has ever done — put the frog back together. If you get all the organs back where they belong (and this is the best part), the frog jumps off the operating table and does a silly dance with a top hat and cane! This one is strictly for the younger set, but it's cool. For more information, write to Scholastic, 730 Broadway, New York, NY 10003

On the road

One of the big debates in the US is, "What can you do with a home computer?" A lot of folks think computers are only good for playing games and word processing. But there's a new program out that has a real practical use — Roadsearch Plus. This is a computerised road atlas of the United States. All you've got to do is type in the city where you live and the city you want to go to, and the computer

will calculate the shortest possible route.

Roadsearch Plus will also give you a printout of the detailed driving instructions, how long the trip should take, and how much fuel you will use. The program contains 406 cities and 70,000 road miles (Write to Columbia Software, Box 2331W, Columbia MD 21045)

That may not be useful to you guys, but here's an idea — why don't one of you hot-shot programmers do the same thing with the map of England? You guys like to go on trips as much as we do. I'll tell you what, when you finish the program and you sell a million of them, just send me 10% of the profits. Do we have a deal?

Another new program you might be interested in is Fast Load Cartridge, from Epyx. It does what it says — it will load and power up disks five times faster than the Commodore disk drive, and copy disks ten times faster. You don't have to type any extra instructions onto the keyboard. Just plug FLC into the Commodore cartridge port and it works automatically, even with the copy-protected disks. It's about the same price as a computer game (Epyx, 1043 Kiel Ct Sunnyvale, CA 94089)

A bunch of hot new games just hit the stores over here Championship Lode Runner (sequel to Broderbund's Lode Runner), Ghostbusters (Activision, based on the movie), Dragon's Lair (the home version of the first laser arcade game).

Gossip corner

While we all sit around and wait for the Commodore firm to officially introduce their new "Amiga"

Lorraine" computer, rumours are flying over what final form it will take. One programmer who I must like my brother claims the machine will sell for just $695 including a disk drive, and that Commodore is working around the clock to write software for it. Another equally trustworthy magazine editor insists the disk drive will be 3.5 inches (like Macintosh), but the computer will sell for $1000.

Yet another "industry insider" claims the computer is powered by three new microprocessor chips, code named "Agnes", "Daphne" and "Portia" I also hear there is a successor to the C-64 in the works The C-128. How do you know who to believe?

The Plus/4 is out, as you know, and a disk drive for it is coming in January Unfortunately, neither is compatible with the Commodore 64 It's too early to tell how the Plus/4 is doing in the US, but some people are saying that several "key employees" at Commodore don't like it They say it's not any improvement over the C-64

A lot of these questions will be answered at the Consumer Electronics Show, which is taking place in January at Las Vegas. I understand the Commodore booth will be right next to the Atari one, and you know who owns Atari now — Jack "Business Is War" Tramiel! Jack started Commodore as a typewriter repair shop twenty-five years ago. He just started another price war, dropping the Atari 800XL to $120. Rumor has it, Jack's about to shock the world with a new machine at the show. I'll be there, and I'll let you know what happens. Isn't this exciting?

Whichnet?

getting haaked an Micranet 800 and Compunet
by Brian Grainger and Ken McMahon

If the last megagame you bought now props up the kitchen table or you've thrown your Programmer's Reference Guide at the cat, you're probably suffering from acute computer boredom. But before you exile your Commodore 64 to the cupboard along with the skateboard and pogo sticks, there may be hope. You can now connect your computer to the outside world by subscribing to either the Compunet or Micronet 800 communications network. How do you subscribe? What equipment do you need? What's on offer? Which of the two is best for you? Brian Grainger and Ken McMahon have the answers.

Compunes and Micronet — the battle is on to get 64 owners into the modem clubs

MICRONET AND PRESTEL

Before getting down to the nitty gritty I should perhaps introduce some of the ideas behind communication networks. We are all used to televisions, telephones and redios for feeding us audio and visual information. Some of you will also know about telex and telefax which are means of communicating the written word between business premises in 1979 the idea of linking all these networks to enable transfer of information from a computer to a display terminal (your telly, to be less precise) vie the phone net work was launched to the public. The Prestel service was born

A little bit of history . . .

The basic idea behind Prestel is that information provided by various

sources, known not unnaturally as Information Providers (IPs), is stored on central computers. Users who wished to read the information would call up the computer using a keyped device connected to the computer via the phone line. The central, or host computer as it is called, would then transmit the information down the phone line to a receiving device, usually a converted Prestel TV Although Prestel was aimed at the home user in an attempt to set the public to use then phones more during off-peak hours it was, because of the high cost involved, only business that used Prestel. In particular the travel industry has made use of it.

In 1982 as the home computing boom got into full swing it was realis-

ed that much of the equipment to use Prestel had already been bought by the home user. The computer had a keyboard and it had a display screen or could connect to a TV. The final link in the chain was a device to connect the computer to the phone network and allow data to be sent in both directions all the while that Prestel would accept

Prestel is set up to transmit information to the user at 1200 bits per second and receive information from the user at 75 bits per second. Thet device, called a modem (modulator/demodulator) operating at 1200/75 together with software to drive it, was relatively inexpensive and they soon became evailable for the major computers such as the Pet,

Apple and BBC micro.

The computer owner now had the means to use Prestel. All he needed was a reason. This came in 1983 when Micronet was launched. East Midland Allied Press (EMAP) decided to become an information provider to Prestel and its 'pegs' would contain information of interest to the micro user. More details a little later, but in essence Micronet can be regarded as an all embracing computer club. Because Micronet is a Closed User Group (CUG) only Micronet members, who pay a subscription, can actually see the information on the Micronet pages and use the Micronet facilities.

Again like a club, Micronet has several subsections dealing with different popular computer makes. A recent addition is a section devoted to Commodore 64 users. Finally, because Micronet is a part of Prestel, all the general information from other IPs would also be viewable by the Micronet member.

Logging on

So let's go into a little more detail about the services available. I shall start with Prestel, of which all Micronet members are a part. The system is designed to be very simple to operate. With modem, TV and phone connected to your computer, it's simply a matter of dialling the local Prestel computer. Some modems will even save you a lot of bother by dialling the number for you provided you have previously stored it in the modem.

When the Prestel computer answers the call it will automatically send information to your micro and

WELCOME TO COMPUN

MUD
DUNGEON
BY AGREEMENT WITH
CENTURY SOFTWARE

MUD—the highly successful adventure game. Letters stand for Multi User Dungeons. Compulsive fun, but at £3 an hour you may end up in Mud Users Anonymous.

ask you for your individual identity number (ID). This number is only given to you when you register with Prestel. Again some modems will allow you to store this number and will automatically send it to the

Prestel host computer when it is asked for.

On successful receipt of the ID the host will then ask for a password. This is for security purposes so that you have an individual code for use

with Prestel to ensure nobody else uses your ID to run you up a hefty phone bill. Obviously the modem will not pay the password automatically so you key it in from the micro's keyboard. There is a facility to change the password should you wish to improve the security still further.

Having got these preliminaries out of the way Prestel will send you an index page which, like all pages, is

displayed on your TV or a monitor screen. The particular page sent will be dependent on whether you simply a Prestel member or whether you belong to Micronet as well.

A page on Prestel has a page

number (up to 9 digits) and in addition can hold up to 26 different screen displays called frames. You can, display the 'e' frame of any Prestel page to which you may have access by keying in the page number and giving the Prestel equivalent of the 'return' key (#). For example *800# will display the 'e' frame of Page 800 which is the Micronet front page. To see the b, c, d, . . . z frames, if they exist, you simply press '#'.

Each page also has associated with it up to ten routes to other Prestel pages which can be displayed by pressing a single key (0, 1, 2, . . . 9) These routes are set by the Information Provides and are used to guide users quickly to where they want to go. For example a page of news headlines may have routes to pages which give more detailed information on a particular news item.

Looking through the frees

This idea of an index page which routes to up to ten other pages (which may each in turn route to ten more and so on) is known as a tree structure and forms the basis of the Prestel information structure. While sometimes criticised by experts it is very easy to use for the beginner and unlike some networks I have tried will be mastered in no time at all.

Now showing on Prestel

Now we know how to move around Prestel what information is available? The following gives a guide
● **News, Weather and Sport** — a number of IPs provide information on these topics
● **Travel Information** — train times and aircraft schedules. The latter much easier to understand than ABC Guides
● **Travel Guides** — information on most towns in the UK including

Starnet — brainchild of Mike Singleton, programmer of Lords of Midnight. An interactive game for 1000 simultaneous players. Has suffered from persistent bugs

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suitable hotels to stay at. International destinations are also itemised.

● **Games** — a number of recreational pages appear on Prestel including a Dungeons and Dragons game.

● **Teleshopping** — provided you have a charge card like Access, Barclaycard etc. It is possible to order all manner of items directly from your micro. This includes computer equipment, household items and books. You can even book theatre tickets at certain theatres.

● **Public Information** — various Government bodies have pages on Prestel so that the user can get the most up to date information on services.

● **Electronic Mail** — you can send telex's within the UK. Send letters through Prestel to any other Prestel user (Mailbox).

● **Interest Groups** — contact services are available for many things. Want to get in touch with model railway enthusiasts? Then put out a message on Prestel and make some new friends. Want a new girlfriend/boyfriend? Then put a message on Gripstico.

● **Discussion groups** — it is now possible to send messages which are very quickly displayed to all Prestel users who might be looking. In this way discussions can be carried out between users logged on at the same time.

Services on Micronet

What about the extra services for Micronet members? Micronet has been very popular. It was the first IP to have a million frame accesses by users in one month. It is not hard to see why. It caters very well for micro users who happen to be an ever increasing proportion of the UK population. The following is a summary of what is now available.

● **Latest Computer News** provided daily, this service really provides hot information. If you are thinking of buying the latest whizzbang computer then somebody on the Micronet team will have tried it a few days from launch and bring back some reality to the claims of the advertisers. Can't get to the latest computer show? Never mind, Micronet will report a day by day.

● **Help line** — got a computer related problem? Then send it to Micronet to put up on the helpline pages. There must be somebody looking who knows the answers.

● **Teach Yourself Programming** — a course in learning Basic is on Micronet.

● **Swap Shop** — got some equipment you no longer want? Then advertise it here.

● **Commodore 64 Microsbee** — all the latest information on your favourite machine is there. That's the plan anyway, information is rather thin on the ground right now

● **Clubsport** — all the major user groups put information here. ICPUG has over 100 pages of information on regional groups, technical tips, news, reviews and a cumulative index to the news letter.

● **Chatline** — Micronet's very own discussion group.

● **Telesoftware** — perhaps the most important area. Micronet pages are used to store programs which can be transferred down the telephone line to your disk drive. They can then be run at your leisure. Many programs are free of charge but some organisations are selling software this way as well.

Registering with Prestel and Micronet

If that lot has whetted your appetite to join up with Prestel or Micronet you'll want to know what to do. If you only want to join Prestel then you will need a modem, software to drive it and you will also need to register with Prestel. A number of modems are on offer from Tandem, Miracle, and Commodore to name but a few. Expect to pay somewhere around £100-£150 by the time you have bought the software as well. It may well be towards the high end for Pet users. For enquiring about registering with Prestel phone the operator and ask for FREEPHONE 2043.

What you pay

If you want to become a Micronet member then, if you are a 64 owner, all you have to do is contact Micronet. They have a suitable modem available, including software, at £123.65 including VAT. When you register with Micronet they automatically register you with Prestel. The address for Micronet is Micronet 800, Telemap Ltd., Durrant House, 8 Herbal Hill, London EC1R 5EJ (Tel: 01 278 3143).

After the initial modem costs you pay for the services much as you pay for your phone. The Prestel service standing charge costs £5 a quarter to home users and Micronet an additional £8 a quarter. Provided you use the service during off-peak hours (18.00 - 0800 Mon-Fri, 13.00 onwards Sat, all day Sunday) Prestel do not charge for use. Certain Prestel pages well be charged for (such as commercial software) but most of the services mentioned in this article are free. Your phone costs while accessing Prestel/Micronet will be charged as normal through British Telecom.

Micronet are particularly proud of their animated Christmas card. Traditionally sitting on news, Micronet had a review of this near. On screen last twenty minutes after its launch. The database contains technical information.

Micronet's Aladdin's Cave of free software. Just three offerings is the Games section but much more in the business including Centrefold utilities which cover their planetary importance.

Commodore Jungle — the most revolutionary part of the new system. This is your bit — write news reviews and software or deal reviews for everyone — the love of the Jungle provide Commodore subscribers can very monitor. Commodore's free software area is called the Software Fort. Contains twice free programs from personality programmer — Jeff Minter. The Notice Board contains free access area of Compunet.

The most impressive thing about Micronet 800 is the massive amount of information available; there are literally thousands of pages of it. There is no directory structure as such, instead index pages inform the user as to what is available. Each item on the index is accompanied by a two digit number which when keyed in takes you, occasionally via a sub index, to the relevant page. There is also a facility to GOTO a page number directly.

This system of information retrieval is not quite as simple as Compunet's. For e atert you have to use two hands which, unless you can write with a

COMPARING MICRON...

command whereas Micronet seems to respond sluggishly. This may seem unimportant but it can save you a lot of telephone time and when you're steering at the screen waiting for something to happen five seconds can seem like an eternity.

As far as software is concerned the major difference seems to be one of approach. Whereas both systems hold some of the titles produced by the big software houses, Compunet have a much more open attitude in that literally anyone can sell anything. So, if you like the look of it, you can buy the latest megagame on offer

WIN A MONITOR

pen in your mouth, makes life a little difficult. Also there are a number of commands to remember although there are usually plenty of prompts to help you out in this respect. Finally it should be pointed out that, for the moment at least, Micronet is much larger than Compunet. It should not surprise you if it's a little more difficult to find your way around

But anything Micronet lacks in this respect it more than makes up for by the speed of it's response time. Despite the fact that both systems operate at a 1200/75 baud rate, Compunet can take anything up to five seconds to respond to a

CROET AND COMPUNET

from Fred Smith in Barnsley. The drawback of course is that Fred's brainchild might not be the masterpiece of software engineering you expected. That's why Micronet don't do it

That isn't to say that you can't sell software on the Micronet 800, just that it has to be very good. It's really much the same as selling it to any good software house. Micronet carry extensive reviews of much of their software as Compunet have now started to do. Compunet also have a facility for users to vote on software they have bought.

Compunet is not nearly as old as Micronet 800. It was officially launched last September as an independent company, although it had originally been set up as a joint venture between Commodore UK and London-based ADP Network Services. Unlike Micronet, Compunet caters exclusively for the Commodore 64. Plans to extend it to other Commodore machines are still very vague.

Hooking into Compunet

As with Micronet, you'll need a modem to connect your computer to the telephone system. The most obvious choice is Commodore's own Communications Modem, for two reasons. For the price of £99.99, you get a free one-year subscription to Compunet, which can be renewed at an annual cost of £30. Secondly, only the Commodore modem (at present) will let you download software from the system — but more about that later

The modem itself is a neat black box which plugs into the 64's cartridge port — you need no extra software or peripherals. The lead is about three metres long and plugs into a standard British Telecom jack socket. If you've got the old type fitting, a socket conversion will cost you around £15.

Where can you get the modem? Probably the best option at the moment is by mail order from Vicsoft. This means you will have to wait up to 28 days for delivery. If you are in a hurry you might try your local Commodore dealer. Commodore is now selling modems through dealers but it may take some time for stocks to filter through. I am reliably informed that Vicsoft have sold over a thousand modems yet there are only three to four hundred subscribers to Compunet so someone, somewhere must be holding on to a few hundred

Once you've acquired your Commodore modem there is one more thing you must do before you can explore the hidden delights of Compunet and that is register with Compunet itself. There are two reasons why this is necessary. The first is so that they know where to send the bills — more about that charges later. Secondly, you will need a user identity and password, these for reasons of confidentiality and for your own protection.

Armed with modem, ID, password, and of course your Commodore 64 you are now ready to get to grips with Compunet. This is comparatively simple as it is handled by software in

the modem. After typing CONNECT the computer will prompt you with a request for a number. You have the choice of twelve telephone numbers in various parts of the country, this being the case you shouldn't have any trouble finding a reasonably local one. There's even one in Luton.

As you type the number it appears on the screen so that you can check it, hit the Return key and the modem dials it for you. Magic! Once connected you will be required to enter your user identity and password, on entering this the main directory is displayed.

Getting around in Compunet

Information on Compunet is stored and displayed in the form of a directory system. Finding your way around is relatively simple once you know how. But to get started you need to know two things: how information is displayed on a directory, and how to give commands to the Compunet computer using the 'duckshoot'.

If you refer to the photograph of the Compunet directory you can see that the title of the directory page — Welcome — is displayed at the top with the page number (1) to the left. Below this is a list of all the items in that directory, up to a maximum of ten. Each directory consists of a page number, a title, and a code identifying the type of entry.

T indicates that a frame of text is present. This may be accompanied by a number: for example T3 means there are three frames of text. P indicates a program (PP = means Protected Program). D indicates a directory entry without accompanying text. Occasionally T or D may be accompanied by a '+' which means there is a further sub-directory under this heading.

Great! I hear you say. But now I know what's there how do I get to see it? This brings us to the duckshoot. Not, as you would expect, a method of mass extermination for mallards, but simply an idiot-proof way of telling Compunet what you want to do. The commands are as follows:

DIR	:	Reveals another directory.
SHOW	:	Reveals a text frame.
BUY	:	Downloads a program.
SAVE	:	Saves a downloaded program.
EDITR	:	Accesses the editor
HELP	:	For when you get stuck
LEAVE	:	Disconnects you.
UCAT	:	Displays a catalogue of your uploaded frames.

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ACCNT : Shows you your bill (best avoided!).

UPLD : Uploads a text frame or program.

LIFE : Used to extend life of entries.

PRINT : Prints current frame.

BACK : Returns to previous directory.

GOTO : Goes directly to a numbered frame.

MAIL : Accesses your electronic mailbox.

VOTE : The Compunet deponeter – allows you to vote on software.

These commands are displayed on a continuous line at the bottom of the screen and can be scrolled past a window by using the cursor keys. When the command you require appears in the window you simply press Return and it is executed.

For example, say you wanted to see the text frame associated with the directory entry 'new dimensions' at page 1000. Using the cursor keys you move the red bar down the screen until it highlights that particular entry. Again with the cursor keys, you scroll the duckshoot until the command SHOW appears in the window. Pressing Return reveals that frame of text. Once you've read it, pressing any key will return you to the directory. This particular entry is suffixed by a '+' which means there is a sub-directory with that heading. To see this directory you would use the duckshoot in the same manner, this time selecting DIR.

The method has the advantage that you only need to use one hand for cursor key operation leaving the other free for making notes of page numbers and other information. All Compunet's facilities are accessed in this way, from simply exploring the database to uploading your own textframes and programs for others to see and use. You can even charge for them.

Now showing on Compunet

Now you know how to find your way around Compunet you'll immediately want to know what's on offer. The introductory pages consist of an explanation of how the system works, what's available, and how to find it. This is generally a good place to start.

● **Latest computer news** – you can obtain the latest news and information about the micro industry. Some of this is provided by a character called (for reasons best known to him/herself) Teddles The Compucat, whose big scoop at the time of writing is the inside story on The Great Prestel Hack

● **Telesoftware** – if news is not your cup of tea, you could try downloading some of the software that's available. At the moment only a sparse number of titles are available. In the games bracket Ulamesoft, Mr Chip and Creative Sparks (Thorn EMI) all have goodies for sale, although by far the biggest supplier is (you guessed it) Commodore. A lot of the software is free, one example being an excellent game by Jeff Minter called Syncro.

Generally speaking, though, don't expect too much from the free software. The commercially available titles cost slightly less than they would in the shops. This seems only fair as the user is forking out the price of a disk or cassette instead of the manufacturer. One important point if you download commercial software, the modem used to receive it must be plugged into the Commodore 64 and the program will not run. For more serious users utilities, business, and educational software are available, everything from a spreadsheet to a spelling tutor.

● **The Jungle** – you can also download software here, but basically it's an area of Compunet given over almost entirely to users. In this instance the law of The Jungle is a sort of controlled anarchy. Primarily it's a bulletin board on to which users can put everything they like, and they do. The main directory divides The Jungle into six main areas – software, small ads, clubs and societies, hobby corner, user notice board, and jobspot. Of course there's nothing to stop you putting your small ad in the software section, but it helps if you try and maintain some semblance of order. The software here isn't always of the highest standard, but that's the price you pay for interactive freedom. The payoff is that this is one of the most interesting and amusing parts of Compunet.

● **MUD** – no description of Compunet would be complete without a bit of MUD. MUD, or Multi User Dungeons is an adventure game originally developed at Essex University by Roy Trubshaw and Richard Bertle. It has now been made available on Compunet by Century Software

The great thing about MUD is that any number of people can play it at the same time. Hence you can be wandering through The Land minding your own business when you bump into Fred the Warrior. You can have a chat with Fred, join forces with him and help each other out. Alternatively he may kill you. The permutations are therefore endless and you have to watch out for yourself.

If you're very good and reach the level of Wizard you become all powerful and everyone has to watch out for you. The only drawback to

MUD is the cost which is £3 per hour plus the phonebill while you are on-line.

What you pay

Speaking of money, use of Compunet will involve spending some. Connect time between 8am and 6pm is charged at a rate of £7 per hour. Compunet is free after 6pm and at weekends. Storage of a textframe costs 1p per day and if you sell any software Compunet will charge you 40% of the sale price for distribution. Compunet will bill you quarterly or when you run up £50 worth of debt, whichever is the sooner. I've found that using the system within it's free and exceeding a certain amount of case over what you buy keeps costs reasonable

Which one is best?

Now we come to the crux of the matter. Which one is best? By now I'm sure most of you will have made up your own minds and besides, nothing's ever that simple. However, for the time being at least my money is on Micronet. When it comes down to it the main purpose of these systems is to provide information and Micronet 800 has stacks of it. It is also very broad in scope. As well as Commodore 64 information and software it offers information on other computers, software and peripherals
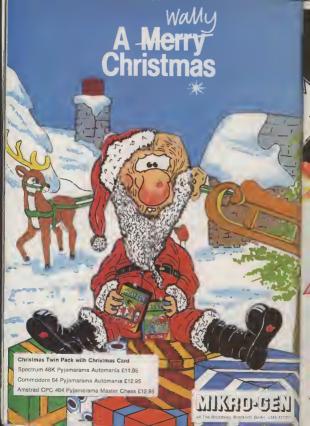
Compunet on the other hand is comparatively small, but it's growing. The one big thing that it has going for it is it's ease of access. In The Jungle you can set up your own bulletin board, club or society, even your own software house. Given an increase in the number of subscribers (there are under 600 at present) it's anybody's guess where this might lead.

The choice is therefore up to you. If you want lots of information now and your maximum input is unlikely to consist of no more than the odd piece of mail or a response frame from Micronet 800 is for you. If uploading your own software, articles, etc. and having a more positive input appeals you will probably get more satisfaction from Compunet.

But one last point may swing it. I have it on good authority that you can now log on to Micronet 800 using the Commodore modem and a piece of software by Viewdata available free on Compunet. You can therefore enjoy the best of both worlds for the cost of the Commodore modem, the software and the quarterly subscription to Micronet (£13).

So if having read this you still can't make your mind up, the answer is obvious. Use both. At £125 all in, it's not as horrendously expensive as you would have thought.

A ~~Merry~~ *Wally* Christmas

GOOD VIBES

illustration,
Anna Lynne

AMAZIN' GRA

FROM SID

ADDING VIBRATO TO YOUR MUSIC

If you listen to a lot of music, whether it's pop, jazz or classical, you have almost certainly heard a singer or instrumentalist use vibrato. Vibrato warms the sound of a solo line and makes it more expressive. In fact, we sometimes say that vibrato "humanizes" the sound — just what the doctor ordered for that cold silicon fish inside the Commodore 64 that we call the SID chip.

It's not especially difficult to add vibrato on the Commodore 64, but before getting into the how-to aspect of things we had better figure out just what vibrato is.

Actually there are a number of different ways to produce vibrato, but basically it consists of a regular variation in pitch and/or loudness. Think of a violinist or a guitarist on a held note — the player's finger rocks back and forth on the fingerboard. This "vibrating" of the hand causes the pitch to rise and fall. Or think of a jazz trombonist playing a ballad. The trombone slide is moved back and forth on a held note, causing a similar effect. These are both examples of pitch vibrato, although there is some variation in loudness also.

Some wind instruments, most notably the flute, vary the wind pressure to produce a vibrato. This produces, as you might guess, a variation in the loudness of the sound, along with a slight variation in the pitch. The amount and speed of the variation are quite important. For example, you would want a wider, slower, more noticeable vibrato for that slow classical music. Or, if you're an opera fan, think of the opera singer who has sung too many Wagner operas that Wagner opera-and — he or she probably won't be coming back for an encore.

Producing a vibrato

The easiest vibrato to produce on the Commodore 64 is pitch vibrato. Type in this program to see how:

As you can see from the REM statements in lines 50 and 70, the program simply raises and lowers the pitch a little bit. How did I figure out how far to go each way? By experimenting, of course. The speed of the vibrato is controlled by the STEP2 and STEP-2 statements. STEP1 would produce a slower vibrato, STEP3 a faster vibrato.

If you want to, you can change the amount of vibrato by changing the amount that "A" is allowed to change: if "A" goes up to 245 and down to 145, for example, you'll get a far different sound.

The problem with this technique is that it gets tiresome to program. If you want an automatic pitch vibrato that works on the interrupt system so you don't have to worry about all of those FOR/NEXT loops, type in this next program:

PART ONE

```
10 A=195:B=100:S=54272:POKES24,15:POKE5,8:NEXT:REM INITIALIZE
20 POKES+24,15:POKES+5,9:POKES+6,240:REM SET VOLUME, ENV NOTE AND ADSR
30 POKES+1,A:POKES,B:POKES+4,17:REM START NOTE AND LOOP
40 FORA=195TO215STEP2:POKES+1,A:FORX=1TO150STEP-1:POKES+1,A:NEXT
50 REM GO UP A LITTLE
60 FORA=215TO195STEP-2:POKES+1,A:NEXT
70 REM GO DOWN A LITTLE AND BACK UP
80 IFNOT(REPEAT 30 TIMES, PLAY THE NOTE WITHOUT VIBRATO, THEN STOP.
90 REM LOOP BACK 30 TIMES, PLAY THE NOTE WITHOUT VIBRATO
```

PART TWO

```
10 FORA=49152TO49341:READA:POKEA,D:NEXT
20 POKES324,168:POKES324,229:REM SET VOLUME
30 POKES+24,252:POKES24,12,168:POKES+24,168:REM SLOW ATTACK
40 POKES+24,229:POKES+24,289:POKES+24,289:REM NEW FULL SUSTAIN & SLOW RELEASE
50 POKES+1,143:POKES+19,18:SYS49157:REM SET PITCHES AND START VIBRATO
60 POKES255,49:POKES+5,17:POKES+1,7:REM START NOTE
70 POKES255,28:POKES+1,17:REM PLAY NOTE WITH SECOND NOTE
100 POKES+1,749000:NEXT:POKES+1,17:POKES+1,17:REM THIRD NOTE
200 DATA1,20,4,0,4,0,120,164,91,14,250:END
300 DATA144,141,192,141,21,3,08,76,120,149
330 DATA160,174,0,192,208,5,21,21,3,88
540 DATA141,76,31,1,92,142,8,142,162
360 DATA164,165,261,202,192,240,7,165,254
370 DATA141,4,193,165,254,141,18,142,141,254
500 DATA174,31,192,240,68,207,254,15,202
560 DATA202,1,192,240,68,287,254,15,282,260
410 DATA202,141,192,165,292,76,24,18,252
620 DATA202,1,133,202,96,154,107,66,133
630 DATA141,8,192,133,282,174,11,192,152,167
640 DATA141,76,49,193,253,292,251,148,292,241
640 DATA192,134,8,144,14,147,4,141,3
680 DATA141,254,141,4,192,133,252,96,133,254
```

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GOOD VIBES FROM SID

Line 10 and lines 500-680 provide the automatic vibrato, lines 20-100 are there just to provide a little demonstration music. With a little modification, this program will provide some rather astonishing sounds, so, if you feel inclined, have a go at it.

Using the automatic vibrato in your own music programs is quite simple. Just include line 10 and lines 500-680 (line numbers are not important but make sure that if your program includes its own READ/DATA lines that it READs the right DATA at the right time) in your program.

When you want a vibrato in voice 1, use SYS49157, and instead of POKEing SID and SID+1 with the pitch information, POKE 253 and 254. Make sure that you POKE 254 or you will occasionally get some unexpected sounds.

Then start the note by POKEing SID+4 just as you normally would. Turn the vibrato off with SYS49170, and remember that when the vibrato is off you need to go back to POKEing the pitch into SID and SID+1.

There are many ways to get a vibrato from SID. You can set voice 3 to a very low frequency, then set up a loop that POKEs SID, PEEKs (27 (the read register for voice 3 frequency). A professional synthesiser player would say that this method uses voice 3 as a Low Frequency Oscillator or LFO.

The disadvantage of this technique is that it uses up voice three without making use of this sound — something to be avoided on a synthesiser with only three voices.

Another way is to use the envelope and gating controls to get an intensity (loudness) vibrato, although I've never gotten one that sounded really good with this method. Maybe one of the boffins amongst you can do better.

Sidney Sawtooth plays on

You can, however, combine all of this voice to create one complex sound with an interesting intensity vibrato. The next program uses all three voices deliberately set a little out of tune with each other (detuning), ring modulation, and envelope (ADSR's) set to different values to make a richer sound than any one voice could provide for this not unpopular folk melody.

Notice in line 110 that the pitch of voice 2 is set a little under voice 1 and the pitch of voice 3 is set a little above voice 1. This "de tuning", along with the ring modulation in voice 3 (more about that in a later article) causes a phenomenon called "beating" which gives the effect of vibrato. Here's how.

Think of the sound waves coming out of your speaker as a series of compressions and rarefactions of the air. The closer together these compressions and rarefactions are the higher the pitch sounds to you.

If two pitches are being fed into your speaker, their compressions and rarefactions will sometimes augment each other, and sometimes cancel each other out. If the two are very close to each other in pitch, they will augment each other and then cancel each other out often enough that you will hear the effect as an intensity vibrato.

If you listen to this program through a good hi-fi set, you will probably hear four notes in each of the last two chords. No, I didn't find a hidden fourth voice in SID, although I wish someone would. When certain intervals are tuned just right, the same acoustical phenomenon that produces the vibrato in this example will give the effect of a fourth voice. Here's what happens.

The cycle of augmented and diminished volume that produces the vibrato is itself a pattern of compression and rarefaction of the air. If we speed that pattern up enough, we will hear it as a note (instead of as a vibrato. One other thing to notice: lines 80 and 90 cause the slide effect between notes.

That's three ways to produce a vibrato on your Commodore 64 — who said SID couldn't sing?

PART THREE

```
10 B=54272:FORL=BTOB+24:POKEL,0:NEXT:POKEB+24,15:POKEB+25,1:POKEV2,65
20 POKEB+3,17:POKEV+6,21:POKEB+12,18:POKEB+18,8
30 POKEB+5,49:POKEB+12,18:POKEB+19,198:POKEB+13,213:POKEB+20,244
40 POKEB+4,17:POKEB+11,21:POKEB+18,17:POKEB+18,8:FORT=1TO700:NEXT
50 POKEB+5,9:POKEB+12,33:POKEB+19,33
60 POKEB+22,200:POKEB+23,240:POKEB+1,17:POKEV+8,17:POKEB+15,1:POKEB+16,1:T
70 READM:READB:POKEB,A:POKEB+1,I:POKEM:READV:READ2:POKEB+7,C:POKEB+8,D
80 POKEB+18,21:POKEB+11,21:FORT=1TODSTEP-1:POKEB+1,A:NEXT
90 POKEB+1,I:POKEB+8,E:FORT=1TOESTEP-1:POKEB+8,D:NEXT
100 NEXT:FORT=1TO90:NEXT:POKEB+4,64:POKEB+11,64:POKEB+18,64
110 READM:READB:READV:POKEV,A:POKEV+1,I:POKEM:POKEB+8,D-1:POKEB+15,D+1:POKEB+15,8
112 POKEB+11,17:POKEB+4,17:POKEB+18,17:FORT=1TO800:NEXT
114 POKEB+5,41:55:POKEB+12,55:POKEB+19,55:FORT=1TO700:NEXT:POKEB+4,16:POKEB+11,1:T
116 POKEB+18,16:FORT=1TO300:NEXT
130 FORT=1TO50:NEXT:POKEB+1,A:POKEB+8,D:POKEB+15,E:POKEB+4,17:POKEB+11,17:POKEB+18,17:END
170 FORT=1TO1500:NEXT:POKEB+4,16:POKEB+11,16:POKEB+18,16
200 DATA16B,158,31,0,21,78,31,10,-1
202 DATA16B,158,18,1,-1,21,78,31,10,-1
204 DATA3,158,18,31,28,-1,49,78,28,20,-1
206 DATA16B,158,35,31,-1,45,78,31,37
208 DATA31,158,18,31,37,31,-1,45,78,31,37,-1
210 DATA16B,158,28,1,-1,45,78,29,30,-1
212 DATA6,158,18,31,31,28,-1,182,26,37,31,-1
214 DATA8B,158,31,28,-1,49,78,28,20,-1,31,28,1,-1
216 DATA31,156,31,28,-1,45,78,35,37,-1
218 DATA3,158,21,31,31,28,-1,45,78,29,20,-1
220 DATA49,209,78,31,-1,45,78,31,28,25,1
222 DATA209,78,78,28,-1,1,49,78,28,25,-1
224 DATA16B,238
```

GOING INTO ASSEMBLY

Four 64 assemblers reviewed
by Ken Ryder and Dermot Williams

There are several ways of entering machine code into your 64. You could painstakingly hand-assemble your list of 6502/6510 mnemonics into DATA statements using a Basic loader. But you could buy a machine-code monitor or, better still, an assembler. The last two methods are recommended to avoid sleepless nights. Ken Ryder has been getting to grips with Audiogenic's machine-code monitor and Doctor Watson's Beginner's Assembly Language, whilst Dermot Williams has grappled with Interceptor's Assembler 64 and Zeus 64 from Design Design.

Audiogenic Monitor

Audiogenic's Monitor, at £29.95, is the most expensive package reviewed here. It is contained in a sturdy, neat, chocolate brown cartridge. It occupies 8K of address space from $8000 to $9FFF, so the Basic program area is

reduced to 30K when the cartridge is in place.

Commands

The firmware offers 17 commands — 16 enable machine code to be entered, examined and modified; the other one allows a Centronics parallel printer to

be connected to the user port via a suitable cable.

Unlike the original TIM monitor found on Pets, which tends to be the starting point for designers (and reviewers) of *any* Commodore assembler, the Audiogenic Monitor boasts an assemble command (A). It accepts standard 6502

mnemonics, addressing notation and hexadecimal operands. Branching is made easy by specifying the branch address instead of calculating offsets in two's-complement!

Conversely there is a disassemble command (D) which displays the machine code in hex followed by the

equivalent mnemonics. At equivalent operands from a specified line. The disassembly stops after each screenful, either the hex or mnemonics can then be overwritten and will be re-assembled automatically.

An area of memory can be filled with the same byte with the F command, useful for setting up screen colours and displays. The hunt command (H) can search an area of memory for a text string of sequences of bytes.

Any area of memory can be displayed in hex values shown in eight columns with the M command, the normal 64 screen editor can then be used to overwrite any particular value. In this way areas of memory can be filled with data for use by the main program. This data or indeed any other area of RAM can be transferred from one location in the 64 to another by using the T

command, so code can be opened up as it expands.

The usual G command is included to run machine code from a specified address at full speed. Alternatively the program can be stepped through instruction by instruction with the current position of the program counter displayed. In addition a 'Walk' command can step through so that at each instruction the contents of all the registers are displayed together with the hex and disassembled instruction. At any time the contents of the registers can be overwritten and the walk process continued. These last two commands are obviously

useful for checking the flow of a program, and for tracing unexpected loops.

Output

Machine code can be saved and loaded from tape or disk with a filename. Unfortunately there's no 'Verify' command to check that the code saved is the same as that in memory. A disassembled area of memory may also be sent to the printer if required (with the P command).

In addition to the monitor features there is also a (C) command to connect a Centronics parallel printer to the user port. Once the command has been executed, control can be returned to Basic and listings, files etc, can be sent to the printer in upper-case CBM ASCII or upper/lower-case true ASCII

Conclusion

Audiogenic's offering is a fairly standard machine-code monitor with the convenience of cartridge operation and the added bonus of a Centronics printer interface provided you have a suitable cable. But the documentation is minimal, lacking detailed examples, and a beginner will need a book to refer to — Commodore's own 64 Programmer's Reference Guide should do. This monitor is aimed at the experienced user, writing relatively short code to be included in Basic programs, or to add commands to the rather limited Basic language.

Dr Watson's Beginners Assembly Language

The Dr Watson assembler course consists of a tape and book presented in a library book type binder. The complete package will cost you £12.95. The tape contains an assembler and a tutor in the black art of hexadecimal.

The menu driven assembler falls somewhere between the Rolls-Royce Mikro 64 and the Audiogenic Monitor, again occupying about 8K of RAM. It is not a true assembler like Mikro 64 where a source code is created and then assembled into machine code (object code). Instead it is a continuous assembler like the Audiogenic offering: it is far more flexible, though.

Labels may be entered and operands may be entered in hex and decimal by default the number of labels is limited to 21; but the assembler is written in unprotected Basic, and instructions are given to increase the limit by altering the program

The assembler also includes the rather advanced feature of MACROs. A MACRO is a series of instructions which reoccur throughout the machine code — it is not a subroutine, though. It is sometimes more efficient to repeat instructions in machine code instead of calling them as a subroutine. Although the occupies more memory it can increase the program running speed. A set of instructions is identified with a MACRO name, from then on wherever that name is used the specified set of instructions is included in the code without having to type it!

Commands

Programs are entered with the usual set of 6502 instructions. Unfortunately the method of indicating the addressing modes does deviate slightly from normal and would have to be

learned when using any other monitor or assembler. The area of memory containing the machine code, or indeed any other part of memory, may be

lated to the screen or printer; only Commodore or equivalent printers are supported, however

The listing is impressive — divided into three net columns. The first displays the memory address in both hex and decimal, the second shows the machine code stored in that address in hex, and the third gives the equivalent disassembled code in Dr Watson mnemonics

Unlike the Audiogenic Monitor, the disassembled code may not be edited. The only way to alter code is to overwrite it, or enter the built-in machine-code monitor. The monitor is identical to TIM (containing the commands S,L,G,R,M,X) so the contents of memory can be displayed in hex and edited.

TIM is loaded into the $C block of memory, and remains there even if the assembler is overwritten with another Basic program Machine code created by the assembler may be located elsewhere, or existing code can be 'opened up' to insert extra commands

The book

The whole spectrum of machine code is covered in this well-written and informative companion paperback of some 240 pages: each member of the 6502 instruction set is explained with the aid of several examples and exercises. The assembler and its functions are described too, together with methods of entering machine code without the assembler (POKEs and DATA statements).

This is where Dr Watson offers a useful option to convert machine code into Basic DATA statements, with user definable program line numbers. These statements can then be tagged on to the end of a Basic program, or one can be written around them. The text even describes where to locate machine code to prevent it being overwritten by Basic. All good stuff.

The 64's Kernal ROM contains many useful machine code routines which can be accessed by your own code, avoiding a lot of hard work. For example characters can be read from the keyboard and output to the screen very rapidly. Lessons describing how to incorporate these routines are also included in the text. There's a comprehensive memory map of the whole Kernal ROM as an appendix, together with a map of the Basic ROM and a general map of the 64.

For the more adventurous programmer floating-point manipulation using machine code is covered. This is a complex subject, but the authors introduce it in a matter-of-fact way using the Kernal's floating point routines and accumulators to maximum effect.

In the same chapter the oft-forgotten or glossed-over subject of the Basic USR statement is introduced. This command is the link between Basic and machine code, allowing floating point parameters to be passed from one to the other. This subject deserves and receives a clear explanation.

Conclusions

Dr Watson's assembler is to the complete novice and is suitable for the development of short-to-medium-sized programs. The accompanying text hook is excellent, written in a relaxed and friendly style and certainly very specific to the 64. Verdict? Excellent value for money.

Dr Watson's Beginner's Assembly Language — £12.95
Honeyfold Software
Standfront House,
Bath Place, High Street,
Barnet, Herts.
Tel: 01-441 4130

Interceptor: Assembler 64

Assembler 64 costs just £7 — and the price shown it comes in a small plastic cassette case just like one of Interceptor's games. That means the instructions are crammed on to the tiny inlay card. Whilst this is ideal for games, it's hardly suitable or adequate for a complicated utility such as an assembler. Incidentally, it is not available on disk.

The assembler allows Basic-like source files to be entered with mnemonics preceded by line numbers and arranged in order accordingly. Apart from standard mnemonics, lines may contain labels, line-number branches and BYTEs.

Labels may be substituted for numbers in all situations, and simple addition may be performed. Line numbers may be used in place of absolute addresses or labels as long as the line number is preceded by the letters 'GO'. For example, 'BNE GO100' means BNE to line 100 of the source file.

The only pseudo-operand is BYT. It is used for inserting numeric data into a program. So BYT 67,85,33 would insert these three numbers into the object code. Note that BYT, and indeed all other mnemonics, accept only decimal numbers. This will obviously slow down a preaching hex programmer.

Commands

However, Assembler 64 does provide two base-changing commands: DEC and HEX. Or does it? Whilst DEC happily converts decimal numbers into hex, I couldn't get HEX to perform the opposite function. That probably means that when writing programs with Assembler 64, you can neither insert hex into your program, nor get the program to convert hex into decimal numbers that it has already accepted.

Source programs may be edited much like Basic programs with lines being edited, added, deleted, inserted and listed. Listings may be directed to both the screen and a (Commodore) printer. And source files may be loaded and saved, with both tape and disk being supported.

Once a source program is complete, the ASSEMBLE command begins the assembly process. But it's a slow three-pass affair which

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assembles directly into memory. And there is no option for saving the object code.

But Assembler 64 imposes a few infuriating deviations from standard 6502/6510 mnemonics: all commas in indexed addressing must be replaced by semi-colons. If you're used to commas, it's difficult to stop them slipping in. Also, and for no apparent reason, absolute numbers must be represented by the 'equals' sign; for example, LDA = 10 or CPX = 255.

Conclusions

Altogether, Assembler 64 is not a very pleasant program to use. The combination of unorthodox mnemonics and accepting but not converting them does little to make the machine-code programmer's lot a happy one. Still, £7 is very cheap, but you could do a lot better.

Zeus 64 Assembler

The Zeus monitor is also available at a potentially bargain price — £9.99. It comes in a more impressive video-style case and includes an instruction booklet.

The monitor

On loading, Zeus jumps straight into the machine-code monitor, and with nineteen commands, it's pretty powerful. There are the usual monitor commands, such as D (disassemble), F (fill), G (execute code) and R (registers). Then there's the not-so-usual and very useful commands like T (tabulate) and C (copy), which accomplishes the 'transfer memory' function.

The T command itself gives a tabulated display of memory contents in hex, eight bytes at a time just like the normal monitor M command. In addition to the hex display, an ASCII display of memory can also be given. This is a real bonus when you're writing programs that involve a lot of text. Then there's the P

command which directs output to a printer, not just a Commodore printer but any Centronics printer.

The assembler

Now to the assembler, which introduces itself by letting you open either a new or old source file. Of course, you can only re-open an old file if you can remember where it is in memory. The default address for source files is the start of user RAM.

Like the Interceptor assembler, Zeus creates source files ordered in Basic-like lines. But Zeus is

more sophisticated because with 'C' meaning Commodore ASCII, thereby saving a lot of memory when storing source

files — which also speeds up loading and saving to tape or disk. It also offers automatic line numbering which works like the AUTO command found in some extended Basics. It also has a command to renumber the source file.

Zeus is very flexible in that it allows numbers to be expressed in decimal, hex or binary, as well as in mathematical equations. Labels can also be used, and

ASCII directly included, with 'C' meaning Commodore ASCII and 6C meaning true ASCII. The 'up arrow' symbol represents high-byte, thus saving a lot of calculating in situations where the X and Y registers must be loaded with the high and low bytes of a number

Pseudo-operands available in Zeus include DFB for defining bytes (same as BYT), DFW for defining sixteen-bit words, and DFC for defining a string of characters. These, and others, make it very easy to include numeric and string data in program

A number of useful commands are provided for editing source files. The F command finds occurrences of a given string in a program. And the C command will change the string to a given second string. As well as loading and saving of source files, Zeus allows a second source file to be appended to the end of one already in memory.

Actually assembling a program is very speedy and takes a matter of seconds. Any errors in the source code are listed along with an appropriate error message.

Conclusions

I could say a lot more about Zeus 64's features which I haven't even explored to the full yet. In all, this is a very professional package which has all the little touches that make an assembler a joy to use. For just under a tenner, it is, in my opinion, a giveaway. For someone looking for either a good monitor or assembler, Zeus has got to be a sound choice.

TEACHER INVADERS

Can software really help teach your kids?

Why did you buy a Commodore 64 for your children? Are you worried that they use it mostly for playing games? If you've asked yourself these questions, you're probably the kind of person educational software producers would like to meet. The education market is growing rapidly, gradually convincing us that with appropriate software, your zapping-machine can become a valuable educational tool. Ken Young takes a broad look at ideas behind educational software and samples some of the most recent offerings for the Commodore 64.

by Ken Young

Practically every micro manufacturer on the market has at some time or other made the claim that their product has untold 'educational' potential. This has led to many parents buying computers with the sole intention of using them as a kind of hi-tech replacement for that old mainstay — the Encyclopedia Britannica.

The dream of little Johnny sprouting untold amounts of new grey matter as a result of a few nights alone with the all powerful grey box has proved to be no more than wishful thinking. But this is by no means a cause for despair. It is a most healthy development. In the short term the suppliers may sell less computers for 'educational' reasons; but in the long term there will be more and more educationally valid programs on the market and less and less utterly mindless 'drill and practice' type software that should have been thrown out long ago along with thermionic valves.

The Commodore 64 is in a particularly good position to benefit from the past 2-3 years of experimentation by software houses in the education market. Many programs that have proved to be successful on the preferred schools computers — the BBC Micro and the RML 380Z — are being converted for the burgeoning home computer market where the only real chance of making a profit from educational software lies.

There's no denying that home computers are educational; they give an insight into the workings of computers at all levels, they encourage logical thought; they offer openings to an ever-widening variety of stimulating micro-worlds. But like all tools their usefulness depends on the intelligence and integrity of the user

Mr T's Shape Games — teaches shape recognition

BMX Number Jump — bike fun teaches arithmetic

Car Journey — good educational software

programs are aimed at the under-12 year old age bracket mainly because programs for older kids are difficult to write and expensive to develop.

The programs to avoid are the computerised tests that make little use of graphics or sound facilities — thankfully these are disappearing fast. A more common trend, particularly for programs for early learners, are packages based around a household character such as Paddington Bear. Another technique is to make learning as much fun as possible by introducing a strong game element as is the case with 'BMX number jump' in which the player races a BMX bike over mathematical hurdles in a frantic attempt to become an ace rider.

Perhaps the most interesting development of all, and one which has all the signs of a continued healthy growth, are the simulation

Paddington Bear is the star of a series of educational games

programs that let the child experience a real situation and have to make a whole range of decisions to achieve success in the game.

Teachers claim these programs are extremely good for 'cognitive' development. The kids just say it's a whole lot of fun. But enough about the theory; let's load up some of the most recent offerings for the Commodore 64 and assess their suitability as educational software.

LEARNING FOR TINY TOTS

Collins Software have come up with a very attractive range of packages that

neetly supplement the best selling Paddington Bear books. The programs are reasonably priced at £7.95 and consist of a short story book, separate loading instructions and computer cassette.

Each program addresses particular needs of early learners such as writing skills and perceptual ability. This is done by use of a number of programs on the one cassette that neatly dovetail to provide many hours of enjoyable learning.

Paddington And The Disappearing Ink is to be highly recommended. It begins with a program called *Letter* that is the best implementation of word-processing for young learners I have ever seen. The child is asked to type in his or her name and is then helped to write a letter; the computer asks for the address line by line and neatly slots it into the relevant position on the screen. Ways of beginning or ending the letter are suggested to add to the child's use of the language.

Letter is complemented by *Type-writer* which takes the child a little further and offers the choice of writing a thankyou letter or a 'having a nice time' holiday letter. There are plenty of prompts to encourage different approaches: such as five different suggested ways of describing the weather — now there's the mark of a British software house.

Another program, Paddington's **Problem Picture**, begins by asking the child to help our cuddly hero match up shapes on the screen (circles, squares diamonds etc.) It includes colourful, clear graphics and musical rewards when the child successfully manoeuvres Paddington and his trolley to the correct shape.

To help reinforce the use of the words describing different shapes the next program on the tape asks the child to guess the correct word to describe a particular shape; each error builds part of a train, which after ten mistakes shunts off and chunders its way across the screen. The sound and graphics will be the envy of British Rail.

Further programs help the child to differentiate between colours and to sort shapes according to shape and/or colour.

The cream on the cake is the final program called *Mosaics* which lets the child design his or her own drawings on the screen. It's a matter of moving a 'tile' around the screen, selecting a shape, and after dipping the shape into the working area of the screen. It's an excellent simulation of computer aided design and could easily have been sold as a program in its own right.

Good Housekeeping Software have adopted a similar approach with the creation of their Mr T Software. Mr T is less 'T' angible as a character but his lively T-shaped body appears giving help and assistance throughout. The range is now being expanded, with each package costing £9.95. Here's two of the latest offerings:

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Mr T Tells The Time consists of four
different activities which encourage
familiarity with clocks. The first,
Matching Hours, shows a clock pre-
sented gradually on the screen. Hour-
ly times are automatically indicated
along with melodious bell chimes
Subsequently the child is asked to
match the positions of the hour hands
on another numberless clock. On
successful completion Mr T shows his
approval by showing all his breakdan
cing skills – definitely better than a
tick in the margin from teacher.

Then there's Clock Numbers which
helps the child learn to place numbers
around a clock face. And O'Clock
brings the activities together by ask-
ing the child to move the hands of the
clock to the correct positions for dif-
ferent times.

Mr T's Shape Games is all about
recognition of different shapes — the
child has to estimate if a falling shape
is going to fit into a larger pattern on
the screen and press the space bar
when it is in the right position. It re-
quires great attention and good tim-
ing. Shape Maker is a little more relax-
ing, allowing the child to select
shapes and colours and to create pic-
tures on the screen.

All the Mr T programs are very 'user
friendly' and are easy to modify for
children of different abilities. They
come complete with a helpful Parents
Handbook with full details about each
program and tons of hints and tips for
setting up related activities. These
programs are to be recommended but
you must be prepared to be very in-
volved in the process of using them
with your kids.

Clever Cloggs (Argus Press, £6.50)
is a series of six different early learn-
ing games. One of them is titled 'Party
Time for age 3 +'. It has its moments:
it begins with an invitation to the child
to be the 'Clever Cloggs' at a party.
The six games involve activities such
as keyboard familiarity, matching
shapes, pointing and sorting. The
games are somewhat primitive and of
limited educational appeal. To make
life difficult there's no easy way back
to the menu once you've started.

This program would get the big 'no-
no' from most teachers and has little
of merit except for its low price.

Following the theme of the cuddly
cousin comes Get Ready To Read
With BJ Bear (Commodore £11.99).
It's an extensive, ambitious package
designed by specialists in the field of
early learning, aiming to introduce 3-5
year-olds to the initial stages of
reading.

There is a total of four programs
each containing ten different 'ac-
tivities'. A colourful BJ Bear Book
with stories and games backs up the
on-screen action as well as a Parent's
and Teacher's manual consisting of
full instructions and progress record
sheets.

Unfortunately the program relies

quite heavily on the use of the 'Magic Voice' add-on unit which increases the cost by another £49.99. Commodore claim that the Magic Voice will be available in time for Christmas and that a range of other programs which make use of its speech capabilities will follow. Those activities that do not utilise the add-on are very useful and centre around recognition of words, sounds and individual letters.

There is very little on-screen help (whatever happened to BJ Bear?) but the package is very carefully put together and is educationally sound. Parents and teachers will appreciate the fact that the computer automatically records the child's progress and an overall summary can be viewed at a moment's notice.

LEARNING GAMES FOR 7-12 YEARS

In these days of the BMX bike boom and hi-tech menia, it's only natural that the games used to teach basic skills reflect the more exciting youthful pursuits — real or imaginary.

BMX Number Jump (Longman £7.95) is a lot softer than the real thing with the added bonus that basic number skills are learnt before saddle soreness even gets a mention.

The object is to move the BMX rider around a set of maze-jumping hurdles as he goes. Only these hurdles which contain the solution to a maths problem can be attempted. It's certainly no stroll in the park, and life is not made easier by a less than friendly kangaroo whose sole aim is to box you soundly off your bike.

There's flexibility, in that different types of mathematical sum can be selected at the beginning of the game (addition, subtraction, multiplication etc. However, the game itself is painfully slow and there's no automatic way out of a game if you fancy a change or want to hand over to someone else.

3D Hypermaths (Longman £7.95) is aimed at the child with definite Luke Skywalker inclinations. The child is placed at the controls of a rocket plummeting through the hyperphere. His aim is to keep on track by avoiding obstacles. Of course the child must solve maths problems at the same time by adjusting the flight speed accordingly.

This game is easy to learn and well designed and should prove supportive to maths work at school. His only worry is that such programs are very much aimed at capturing the imagination of the boys and has limited appeal for most girls.

Word Wobbler (Longman £7.95) is a spelling game requiring considerable dexterity in avoiding word-wobbling aliens whilst collecting the letters needed to make up different words. The game has a word bank of 1500 words which are divided up into five difficulty levels. It is possible to

modify the lists by inserting your own words.

The sound effects are suitably menacing and the game easy yet fast-moving enough to be very addictive. Word wobbler will be a favourite at home and school

Punctuation Pete (Hill MacGibbon £9.95) is surely the most engaging program around. It features Pete the Punctuator whose animated form runs around the screen helping the child with sentence construction. He boots lazy letters into capitals; slips commas into place, and gently drops full stops in at the end of sentences.

To begin with, the child must try to correct a given piece of text. Once complete, Pete walks around the text (the animation is superb) pointing out where mistakes occur. After going these chances to correct again, Pete then runs around the screen to do the final corrections — no effort spared for the sake of correctness.

The level of difficulty can be selected — in runs from junior school to super scribe — and a number of different passages can be selected. Unfortunately new ones cannot be created.

Another program called Wordfinder is also included. It allows children to investigate connections between words and to search for similars. Words are presented and a mini database of related words can be scanned. This Thesaurus of words can also be dipped into whilst playing the anagram and hangman games included. It's an excellent way of illustrating how a database might be used. To complement the program the supplies include an immaculately produced booklet with background information on the history of the written word and punting, ideas on writing a story, and games to play.

Fun To Learn (Shards, £5.95) is a pot-pourri of learning games counting against the clock, a hangman type wordgame; an adding game, guess the word against the alien; codebreaking

On paper it sounds impressive but the games are rather dull and unimaginative and are unlikely to stimulate a child's mind for very long.

Facemaker (Commodore £6.95) is a particularly imaginative program encouraging an open-ended approach to learning from parent and child

The child is able to use the computer to build up a face based on descriptions that he feeds in. Bit by bit the face is created like a police identikit according to the descriptions given

The creators have put plenty of effort into making the program as powerful as possible, you can even specify the type of hat to be worn, the length of hes, and whether or not an earring is worn. Such a program can happily be used by a child alone or a whole family group. It will take a long time before the interest in Facemaker wears off

SIMULATION SOFTWARE (8 YEARS UPWARDS)

There's no doubt that simulation software gets the biggest 'thumbs-up' from teachers (some even say they get the children too motivated and go down equally well at home.

Typically a simulation program lets the child take part in a simulation of real-world events making all the necessary decisions and taking the consequences of those decisions as well.

Special Agent (Hill MacGibbon, £9.95) involves the child in a rapid-fire chase around Europe in search of a killer spy who is gradually annihilating British Agents.

The secret to the game lies in consulting on-screen timetables of flights and rail departures and moving rapidly from city to city decoding secret messages that hopefully lead to the capture of the enemy

All the excitement of foreign travel and the unravelling of a constant stream of messages leave the child totally unaware that he or she is ac-

tually learning some very useful skills: dealing with timetables, European geography, translation.

The booklet included is an excellent addition with stories about spies, maps of Europe, and other games to play. It's well designed and effectively colourful.

Ballooning (Hill MacGibbon, £9.95) is for the more aeronautical at heart. It simulates the flight of a balloon over various terrain and teaches a simple understanding of as flight. Unlike many programs it does not expect you to develop the skills required overnight. Instead, you are given the option to practice or go on a test flight before attempting a full mission.

The screen consists of a small balloon and the outline of land, which as you take flight, scrolls from left to right across the screen The flight of the balloon feels very realistic and needs plenty of effort to control properly — too much thrust and you're forced into the heavens, too little and you crash to the ground below only to be welcomed by a tether touching RIP sign.

Your son or daughter won't become British Airways pilots overnight, but it's a whole lot of fun and bound to please. Incidentally, a teacher recently told me that he class had so many ideas from using this program that she had to abandon all other work for two weeks

Car Journey (Hill MacGibbon, £9.95) puts the child in the position of being the owner of a delivery service, delivering parcels and packages throughout the country to four simulation style the child constantly has to make important decisions: what kind of car or van to buy, what contracts to take, what routes to take, what speed to travel and so on.

There are a range of screens that can be viewed at any time (this 'windowing' effect is at the forefront of much business software) showing current road position, state of the bank balance, distance and fuel progress charts. Once again the enclosed booklet is well produced and contains a range of background information and further ideas.

The only falling of Car Journey is that it's too addictive. You and your child will be hooked from the word go and you're unlikely to get anything else done for a good few hours. You'll be learning a great deal in the process too. And that's probably the essence of good educational software for youngsters

◆ Next month, we'll be looking at educational packages for the older youngster — the range of O-Level revision courses from Longman software.

When you've got bored with your tea chest full of shoot 'em ups and your latest mega-screen adventure, you might cast a longing eye over those old favourite board games like Monopoly, Scrabble, Othello, draughts and Chess. Remember them? If you're a board game nut, you'll be pleased to hear that all these hardy perennials can now be played with the Commodore 64 Jennifer Goldsmith has looked at what's available, some commercially, some for free.

Scrabble

Scrabble is such a popular game it needs no introduction. Now, a computer version for the Commodore 64 from Leisure Genius is available at £12.95 Whether you buy the tape or disk version, Computer Scrabble comes attractively presented in a pleasantly illustrated box with a 16 page manual

Getting started

When loaded, Computer Scrabble displays a miniature yet otherwise identical version of the original board. Computer Scrabble then asks a few questions like the names of the players and whether you want the computer to play. They you are ready to go

Like the original, a maximum of four players can take part whether all humans, all computer or a mixture of both. All the rules of the game are incorporated in Computer Scrabble and they are explained in the manual.

When it is your turn you can select one of the nine options displayed on the screen. These are quit, pass, premium values, tiles, change, juggle, hint and swap. Quit allows you to leave the current game and asks you if you would like to play again.

Pass allows you to miss your turn which you would do only if you could not make a word and there were no tiles left to do a swap. Premium tells you the value of the different coloured squares on the board whereas Values shows you the numerical value of the different letters of the alphabet

Tiles indicates how many Ds (for example) there are left, the total number of tiles remaining is indicated under the player's scores. Change lets you change certain tiles in you rack so you juggle alters the order of the tiles in your rack. Her helps you if you cannot think of a word and Swap lets you swap racks with your opponent.

So in fact you have more features available to you than if you are playing the original game One point, though, if you don't want your opponents to see the letters you're working with they'll have to turn a blind eye whilst you inspect your set

Conclusion

Computer Scrabble can produce hours of fun whether for one person playing against the computer or a family evening's entertainment. And at least the dog cannot walk across the board and upset the tiles! One reservation, though: the tape version of Scrabble takes about fifteen minutes to load You could have almost played a game in that time.

Colossus

Colossus from CDS Microsystems is one of a number of chess programs for the Commodore 64 but claims to be the best, aiming to meet the demands of keen chess players whether they're beginners or genuinely playing blindfold. The program comes on tape (£9.95) and disk (£12.95) both of which are attractively presented in a

video-style case with a sixteen-page pocket-sized manual

Getting started

Leading Colossus takes about two minutes from disk and about four times as long from tape By that time, you could be well into a conventional game. Still, the board is clearly displayed with excellent graphics for the pieces conventional algebraic notation is displayed around the border The move which Colossus is considering is indicated to the right of the board. You can change the colour of the white squares and the border to suit your preferences.

By pressing the space bar a second screen appears showing the elapsed times for white and black, the seven last moves the number of plys (half-moves) ahead Colossus is thinking, number of positions examined, the best line of play found so far and the score The latter is divided into material and potence.

The score which relates to material is fairly simple to comprehend. For example a pawn down is represented by a pawn down is represented by 1 However, the score which relates to potence is not calculated in decimal or 'pawns and a large plus figure should mean that you have a large potential advantage and so on But I don't think that is always the case: when you make your opponent the score gives you a large material advantage (65) and a minus figure for position!

Playing the game

To enter moves you can either

dice!

board games for your
64 ------ by Jennifer Goldsmith

use the cursor or the algebraic notation providing you remember to SHIFT the letters. Both methods are clearly explained in the manual. If the move involves promoting a pawn, Colossus will ask Promotion piece? Colossus is familiar with the 3 fold rule, 50-move rule and Stalemate as well as with Checkmate.

The level of difficulty at which Colossus will play is determined by the time allowed per move or per game. The first mode lets you play Tournament style. That means X moves have to be played in time Y followed by a secondary parameter of A moves in time B The Average Mode asks the time per move. This can be anything from one second a move to 59 mins 59 seconds a move. So it's useful in lightning chess (ten seconds a move) or for analysis.

Mode three needs the time for the total game under the five-minute chess. Mode four makes Colossus play in the same rate as you. There is the infinite mode which means Colossus will continue to look until you interrupt it, finds a mate, or it has searched ahead

Lastly there is the problem mode which has two sub-divisions. One sub-division will find normal mates in up to seven moves whereas sub-division two will find self-mates which is a major advance as many good chess computers do not provide this facility There is no facility for help-mates (ie you help your opponent to mate you). This may sound strange but help-mates do occur in problems as do self-mates.

Special features

The Alter position! command will let you set up a particular position easily and if you make a mistake the original position can be recovered by pressing the 'O' key

During the course of a game you can step backwards and forwards, so you can check mistakes and even replay the game. Colossus can also play against itself and you can replay the speed you want. You can even set the elapsed times for each side and if you want to play a friend then Colossus will supervise to make sure you don't cheat. This is also useful if you were to run through the moves to

get to a certain position. Finally, you can play 'blindfold' chess by making the board go invisible.

Naturally, you can save the game on tape or disk, not just from the stage you have reached but all the moves from the start to the current move (max 120). But there is a problem here only one game per disk can be stored as Colossus always allocates the same name for the file. If this could be amended so the user allocates the file name this facility would be perfect. The minor snag is that when you save the position you do not save the line of best play, which would be useful especially when you have had the machine running for hours It would also be nice if one could get a hardcopy of the moves of the game

Conclusion

Colossus is a well designed program inclu ding many features plus comprehensive opening theory not seen on other home micros and I must be the best chess program available for the Commodore 64 and at £9.95 on tape and £12.95 on disk, every keen chess player should have a copy. It is simple to use yet more fun than a board as you can learn so much more and, of course, you can play games whenever you want.

CDS Micro Systems
'COLOSSUS CHESS 2.0'

Commodore

Commodore 64

Draughts

This hardy perennial game has been written for the Commodore 64 and is available on tape from Supersoft Software for £7.95

On loading the program, a which asks caption is displayed. After selecting your rules such as 'must take all, the screen displays various options. When you have finished with the options the board is displayed, annotated like a chess board. Elapsed time for each side and how the computer is thinking is displayed as well, on the right of the screen.

Playing the game

Like chess, you can set the level of play and the games can be saved, loaded and replayed. The colours of the various parts of the screen can be altered and the moves can be input either with the cursor or through algebraic notation. Sound is used at appropriate times, for example when the computer moves pieces or when you make an illegal move

Conclusion

Draughts is a well-written program that provides more facilities than the original board game. But, like all computerised versions, you don't get that feel of satisfaction when you've jumped over a whole row of your opponent's pieces.

Kensington

Kensington is available for the Commodore 64 both on disk and tape from Leisure Genius at £12.95. Whichever you buy, the game comes attractively presented in a box with a 16 page manual. The object of the game is simply to try and occupy all six points of a white hexagon with your own colour stones.

On loading Kensington displays a pattern of adjoining triangles, squares and hexagons. Colour is used but you cannot change them because they form part of the program like Scrabble

In play

Only two players can participate whether both human, both computer or one of each. You are requested to place your stone on the board, which you do using the cursor controls illustrated in the manual. The first player to form a hexagon wins. During play if you form a triangle you can move one of your opponent's stones and if you form a square you can move two of your opponent's stones.

Conclusion

It is quite an entertaining enjoyable game at the beginning but now I can beat the computer on top level and I have not played more than half-a-dozen times! However, against an opponent the game can last from 5 minutes to anything up to 5 hours.

• Also available from Leisure Genius are two more old classics: Mastermind and Cluedo.

PUBLIC DOMAIN SOFTWARE

Othello

Othello, like Chess, is a game involving strategy, simple enough to take a minute to learn yet years to master. You have to capture your opponent's pieces by trapping them between yours. Othello comes on disk and most probably also on tape. And you can get it from the library of user groups providing you are a member. You can experience one human versus computer and human versus human!

Load and run

The board is like a chess board but with the numbers 1 to 8 arranged horizontally instead of vertically and the letters A to H vertical instead of horizontal. Moves are made silently, in fact sound is not used at all - even if you make an illegal move! Screen colours cannot be changed either.

The computer selects who shall move first. When it is your turn to play you show the computer where you want to place your piece by entering the cell reference, for example d3, e6. If when it is your turn to move and you are unable to capture at least one of your opponent's pieces then you press 0. If you try and make an illegal move the computer lets you know

When there are no more cells to fill or neither player can make a capture, the game ends and the computer issues the winner and the score for each player. No running score is shown.

Monopoly

Monopoly has been adapted for the Pet and Commodore 64 under the name Monopole. Like Othello it is public domain software but the English version is only available to members of the user group ICPUG. Monopole is available on both tape and disk. A manual is not needed as the game is self-explanatory for those unfamiliar with the original board game

Do not pass go ...

On loading Monopole and after a brief introduction to the board is displayed. It is identical to the original board in colour and design, the sole difference is that the property names are not visible. You may think that's a problem. Not really, because when you land on a property the property name is immediately displayed on the screen and deed details and other information are available on separate screens.

To roll the die, you simply press R If you want any information or you wish to carry out a transaction, such as mortgage properties you press T and various options will be displayed. You then select the option you require and the screen will then display the required information. You can then select another option or return to the game

If the property belongs to another player Monopole automatically transfers the rent due and alters the balances so there is no squabbling

Property development

Sound effects like the sirens when you go to jail are a big advantage over the board game. However only two players can play which means that it is no longer a family game. Also when building on properties you have to distribute the houses as evenly as possible rather than deciding to have four houses on one property and one on each of the other two, for example

Conclusion

The original adaption of this game was done for the Pet but the version for the 64 has the advantage of colour and sound It is still an exciting game which will keep you amused

for hours and as it is available free of charge what more can be said for it? The programmers have done a very good job.

Mastermind

There are two versions of this game, one using colours and one using numbers. I will deal with the version using colours first. This has been written for the 64 under the name Master Guess and like Monopoly, is public domain software. As the instructions are simple and are displayed on the screen there is no need for a manual.

The object of the game is to work out the secret code which the computer has generated. A white peg indicates that you have guessed the right colour but the wrong location and a black peg indicates that you have both the right colour and the correct location.

The colours are represented by letters, for example R for red, Y for yellow which means a peg as colour graphics could have been used. You have a maximum of ten attempts at guessing the code and of course you can work out the original board game When you have made ten attempts or have broken the code the master code appears.

Conclusion

This is a good imitation of the original but it is a pity that the colour, graphic and sound facilities of the Commodore 64 have not been exploited to the full But for free, who can complain? The version using numbers has been written by Commodore Educational Software and is similar to the 'colour' version but this version has even less colour than the former and again, there is no sound

more fun from your micro

Leisure Genius presents COMPUTER SCRABBLE

DAILY Mirror COMMODORE User

SOFTWARE TOP 30

THIS WEEK	LAST WEEK	WEEKS ON CHART	TITLE	Publisher	Computer	SPECTRUM	VIC 20	COMMODORE 64	ELECTRON	ATARI	DRAGON	ORIC	BBC	CYBER
1	1		Ghostbusters	Activision	CBM64			*						
2	4		Daley Thompson's Decathlon	Ocean	CBM64	*		*						
3	3		Beach-head	Access/US Gold	CBM64	*		*						
4	5		Chiller	Mastertronic	CBM64			*						
5			Select One	Computer Records	CBM64			*						
6	7		Suicide Express	Gremlin Graphics	CBM64			*						
7	6		Wanted Monty Mole	Gremlin Graphics	CBM64			*						
8	8		International Soccer	Commodore	CBM64			*						
9	5		Zaxxon	US Gold/Access	CBM64			*						
10			Bruce Lee	US Gold/Access	CBM64			*						
11			Solo Flight	US Gold/Access	CBM64	*		*		*				
12	10		Summer Games	Quicksilva	CBM64			*						
13			Eureka	Domark	CBM64			*						
14	14		BMX Racers	Mastertronic	CBM64	*		*						
15			Blue Max	US Gold/Access	CBM64			*						
16	2		Jet Set Willy	Software Projects	CBM64			*						
17			Bionic Granny	Mastertronic	CBM64			*						
18			Lazy Jane	Vortex	CBM64			*						
19			Tornado Low Level	Terman	CBM64			*						
20			Danger Mouse in Double Trouble	Creative Sparks	CBM64			*						
21			Bunchback	Ocean	CBM64	*		*						
22	20		Manic Miner	Pog Byte/Soft Proj	CBM64			*						
23			Cascade	Cascade	CBM64			*						
24			Zaxxon	Mastertronic	CBM64			*						
25			Zeta 7	Mogul	CBM64			*						
26			Scrabble	Leisure Games	CBM64			*						
27	27		Vegas Jackpot	Mastertronic	CBM64			*						
28	13		Football Manager	Addictive Games	CBM64	*		*						
29			Loco	Alligata	CBM64			*						
30	18		Flight Path 737	Anirog	CBM64			*						

Top 20 Games for the 64

	TITLE	Publisher	Computer			TITLE	Publisher	Computer
1	Ghostbusters	Activision	C64		11	Solo Flight	Access/US Gold	C64
2	Daley Thompson's Decathlon	Ocean	C64		12	Summer Games	Quicksilva	C64
3	Beach-Head	Access/US Gold	C64		13	Eureka	Domark	C64
4	Chiller	Mastertronic	C64		14	BMX Racers	Mastertronic	C64
5	Select One	Computer Records	C64		15	Blue Max	Access/US Gold	C64
6	Suicide Express	Gremlin Graphics	C64		16	Jet Set Willy	Software Projects	C64
7	Wanted Monty Mole	Gremlin Graphics	C64		17	Bionic Granny	Mastertronic	C64
8	International Soccer	Commodore	C64		18	Tornado Low Level	Vortex	C64
9	Zaxxon	Access/US Gold	C64		19	Lazy Jane	Terman	C64
10	Bruce Lee	Access/US Gold	C64		20	Danger Mouse in D'ble Tr'ble	Creative Sparks	C64

Look out for the brand new Top 10 in the Saturday edition of the DAILY MIRROR EVERY FORTNIGHT
The information for the Top 30 is compiled by N.O.P. Market Research Ltd, and founded by COMPUTER & VIDEO GAMES magazine in sponsorship with the DAILY MIRROR

Rocket Roger
Commodore 64
Alligata
Price £7.95

Presentation:	■■■■
Skill level	■■■
Interest	■■■
Value for money	■■■

There's some real hover fever here - a joystick can be used simply because there are too many operations to perform concurrently. Try to combine the accuracy of upward thrust with lateral movement whilst pumping out laser bursts. Thirty new skill-sapping screens to rummage yourself in, though you must be prepared to accept a squashed playing area.

Perfecting keyboard control will keep you quiet for some time, then these are the mysteries of the planet itself. Really

a stricture mode, just to come to grips with get-pack flight (and free fall) is called for. Meteors are no respecters of your sensibilities and quickly eat up lives. To collect the 99 crystals demanded will require all your skill, guile and experience.

Above ground all the rushes are appetible, down in the burolle-hoppers fiendishly school, patrolling endroids are invulnerable what's more in some zones a multitude of mortal meanies in set in warping to plague you almost

Di's Baby
Commodore 64
Bad Taste
Price £6.95

Presentation	■■■
Skill level	■■■
Interest	■■
Value for money	■■■

This one comes straight from the heart of the gutter (press). It's a five part piece of inside garbage that sells so close to the wind that it's within you well (and find himself on a one way tour to the Tower.

The destiny of the nation is in your hands. You must help the Royal Couple do what comes naturally whilst listening to suitably regal prog position music (nice'n'rest 'Careless Whisper.)

So enter one in a loopy-lu-vy version of Space Invaders, with the meanies replaced by potties, and the mother-ship

by a nappy. The potty bombs bring a whole new dimension to the idea of SPLAT! Though it adds weight to the argument that royals are just like you and me

Successful retaliatory shots to the potty bombs (numbers two screen, you might say) with toilet rolls bring you to the next stage. This is where it starts getting a little naughty. You must lead Charles to Pa in van of the nuptial bed. If everything goes according to Pa's wishes of nature Mum it's your jobto watch over

Eddie Kidd's Jump Challenge
Commodore 64
Digital Integration
Price n/a

Presentation	■■■■
Skill level	■■■■
Interest	■■■■
Value for money	■■■■

The list of celebrities now endorsing computer games seems never ending. At the last count we had Rolf Harris, Tony Hart, Lee Majors, the Stranglers Thompson Twins, Shakin' Stevens, the enthar-crew from Dallas and Roland Rat

So it comes as no surprise that stunt bike rider - Eddie Kidd should want to jump on the bandwagon.

Eddie was at the Personal Computer World show in September in all his gear signing autographs, and assuring all and sundry that he was really "into" computer games

The fact that Eddie was brought in for

his name alone matters not a jot as the game is an excellent one with some really impressive graphics

The aim of the game is to successfully jump as far as possible and man can control it bike on landing

Before you can attempt the classic Eddie Kidd leap over several cars you must first clear a row of oil barrels

The bike and the rider are controlled seperately so that the computer is act-ing as the motor bike and you are actually riding it.

The function keys provide the gear controls - F1, first F3 second, F5 third

green Yamo

Bruce will need all of his eighty, kicks and punches to defeat these foes. This toughest of his opponents are the Ninja who can dodge and kick back. The gian green Yama can be taken out with the six swift kicks

Both the Yamo and the Ninja track you throughout the twenty screens of the game.

To move from one level to the next you must first collect all the hanging lantensin that level

Bruce Lee
Commodore 64
US Gold
Price £6.95

Presentation	■■■■■
Skill level	■■■■
Interest	■■■■
Value for money	■■■■

Yet another celebrity lending his name to computer games - in this case the late Bruce Lee - the most famous expo-nent of the Martial Arts of all time

Bruce finds himself in ancient Japan - his mission, a small matter of discov-ering the secret of eternal life

The man who holds this secret lives high up on the summit of Mount Fuji in a fortified palace

Determined to stop Lee from seeking an audience with the wizard are the Ninja and the particularly nasty giant

Drelbs
Commodore 64
US Gold
Price n/a

Presentation	■■■
Skill level	■■■
Interest	■■■
Value for money	■■■

Drelbs is that rare thing these days - a different computer game.

Play commences in a maze at the centre of the Drelbs Kingdom The maze is made up of swing-gates that change their position as you move through them

The object of the game is to make as many complete squares as possible by closing the gates on the three sided squares Once a square has been 'closed' it will begin to pulsate You have to secure all the potential squares

on the grid

Out to stop you are the Trollabears who can else flip gates The Trollabears are the evil destroyers who are out to wreak your square building prog ramme Your only defence against the evil Ts is to trap them temporarily in completed squares

Once all your squares are complete some of them will turn into Drelbish windows - you can hop through these into the dark corridor

You are now in the land of the Gorgo

58

willy-nilly. Security teams, eludes and conveyor belts will provide headaches especially as the Zone Master is ready to snatch a life for slow progress.

In a nut shell Rocket Roger is an imaginative obstacle strewn quest for Iwxsaure with a complement of intelligent tactic intruders likely to provide hours of engrossing entertainment. But only after you have perfected the delicacy of touch to exploit the rocket-pack fully. I'd be content to explore the whole play area. let alone "win"

Or for the next nine months.

She must fulfill her engagements, by avoiding or shooting persistent press hounds (the game might yet go down well at Buck House). Finally it's time for Jo that mad dash to the hospital was scrolling maze with all obstacles. Finally our heroine is forced to negotiate a ladder complex avoiding a syringe and catching the baby as it is dropped by a flight of passing storks (the ill-test is then not to use the NHS.)

Yes, it is really this mucky. **WE ARE**

Rocket Roger is further proof that there is plenty of programming talent left at Sheffield-based Ailgate despite the departure of one Tony Crowther, Superstar.

Even if Tony's leaving has not had too serious an effect on the fortunes of Ailgate it has made them slightly paranoid about talking to computer mags. One Ailgate programmer apparently got the idea of launching out on his own as a result of the magazine's interview.

NOT AMUSED, and neither it seems are those concerned—all we could get from Buck House was a terse 'no comment'. This game is too bad taste enthusiasts everywhere. Lovable we hate it, Willie Hamilton supporters will love it.

The royals have so far avoided the ill tension of software houses—about the only part of the publishing world that has so far not tried to capitalise on royalty. It can surely only be a matter of time though before we will be made to cringe at Royal adventure games.

and £7 fourth. The Commodore say causes the title to swerve to one side at low speed as can be used to abort a jump at the last moment if you judge that your speed is not sufficient to clear the obstacles.

The key to success in the jump game is to judge the speed accurately to get safely over the obstacle.

Eddie can be made to stand, lean forward, crouch down, or lean back in order to balance his bike.

The most exacting part of the game is when you take off and taxi through the air watching those care cross past between

As well as punching and kicking the enemy Bruce can also be made to leap, jump and duck.

One great strength of the game is the options—there are lots of them. You can play against the computer, or an opponent, or two of you can team up to take on the computer.

Points are awarded for various achievements. Kicking the Ninja earns 75 points, a kick is worth 100, taking a fasten earns 125, knocking out a Ninja is worth 200, and knocking out a Yamo

neath you. If you should clip the last one Eddie falls and the bike is hampedessly out of control as breaks squeal and you can hear metal hitting metal.

Apart from the jumps it is also possible to attempt other stunts — such as wheelies. To do a wheelie you simply build up speed and pull back on the joystick to make Eddie pull the handle bars up.

Although the graphics are tremendous I'm not sure there is enough of a lasting challenge to the game. That slight worry aside it is still bound to be a great hit with Eddie Kidd fans.

game 400. Every time you enter a new room you get two thousand points bonus.

The largest bonus of all is awarded for killing the wizard — a massive 300 points. An extra Bruce is awarded when you reach 40,000 points and for every subsequent thirty thousand points after that.

Bruce Lee was the first of US Gold's vastly big hits when it was launched on the Atari earlier this year. Now 64 owners can get in on the action.

Fighter Pilot
Commodore 64
Digital Integration
Price £9.95 cass £14.95 disk

Presentation	●●●●
Skill level	●●●●
Interest	●●●●
Value for money	●●●●

In the battle for supremacy in the games market the British hits have been few and far between.

American importers with games like Beach-Head, Bruce Lee and Boulder-dash have been cleaning up in recent weeks.

So it's nice to see one British company beating the various Yanksoft offerings in the dog-fight to produce the best flight game.

The company is Digital Integration and the game is Fighter Pilot — now available for the 64 after its Spectrum version topped the games charts for weeks earlier this year.

The game features all the superior sound and graphics that we have come to expect from Spectrum to 64 conversions.

Flight controls and game play options are many and varied. You can practice landing — one of the trickiest manoeuvres that any pilot has to cope with. Also you can attempt blind landing which simulates landing in fog. If the dice does not sound difficult enough for you you can also add extra hazards like crosswinds and turbulence.

To activate your guns, press the space bar — although you can only use 12 rounds in combat mode. As with all first wave attacks the other mode in the game Combat mode — much damage — simply dive below the hazard screen to make yourself safe.

Training mode puts the enemy at a disgustingly unfair disadvantage — you can fire at them but they cannot fire back. If you just like blasting things that move you can have great fun with the training ground — but with the training fog find it necessary to turn and run to mode — watching the enemy drift into your sights and then pick them off like original target and set out to destroy flying elephants.

None of the other flight games I tested came close to Fighter Pilot to the 64.

complexity and game-play. Spitfire Ace from US Gold — sounds like it should be a British game — has none of the sophisticated combat of the Digital game and none of the play-options that make FP easy to get into but difficult to master.

There are no less than sixteen different commands that it is possible to execute — giving some of the real complexity of flying a jet fighter.

Fighter Pilot's programmer Dave Marshall, is uniquely qualified to write a flight game—having worked for several years on computer systems for the Royal Air Force.

The flying training option positions your aircraft at the threshold of the runway bass fairly due North. Take off is slightly easier, if the mode than in some of the other flight sims.

The main enjoyment of Fighter Pilot comes when you have mastered the controls and become a competent pilot. You can now take the USAF F15 Eagle into combat—which is Fighter Pilot's great strength over traditional flight simulations.

In this option you are scrambled and given a mission to defend four airfields. Your air computer and radar tell you if the position of the enemy aircraft and you set an Intercept course. The dog fight is on at less than a mile distance and 5000 feet altitude. Combat only takes place at this altitude. To turn and climb sets several turns — which sometimes be necessary when they have sustained too 5000 feet level is distance yourself at a mountain a mile from the enemy.

If you sustain four direct hits you are finished. All hits are registered by a change in colour on your radar. If you don't get up target to turn and run to mode — get repairs the enemy will lock on to this your sights and then pick them off like original target and set out to destroy flying elephants. your ground installations.

For my money Fighter Pilot is the best flight game now available for the 64.

SCREEN SCENE

Orpheus in the Underworld
Commodore 64
Sterling
Price £6.95

Presentation	▪▪▪
Skill level	▪▪▪▪
Interest	▪▪▪▪
Value for money	▪▪▪▪▪

This is Pitfall, but with Egyptian decor and a Hellenic Hero. 'Can-Can' is the dominant tune on playing and there is export from the title but two other opus provide some variation.

The 120 screens are liberally woverwith continuous or hazards varied from the following pits, boulders trolling or stationary floor traps, white birds, poisonous green plants, crumbling saves and the essential magic vanishing holes. Below ground there is a continuous barrage of firebells. Each subterranean screen is the equivalent of two on the surface.

Skills required are accurate well timed leaping with hopping and ducking, equally essential adeptness at rope swinging doesn't go amiss either. By taking advantage of the CHEAT keys it is possible to scroll your way through all the screens without losing a life, and earning the hieroglyphics and monks as you grab the point giving goodies. A good, colourful version of a well defined game.

Stock Car
Commodore 64
Micro Power
Price £6.95

Presentation	▪▪▪
Skill level	▪▪▪▪
Interest	▪▪▪▪
Value for money	▪▪▪▪

An upgraded, sophisticated example of that perennial filler 'Volcanic, Typo n Yourself' Bugridden Games for your 64' books Crash, bash, steer, skid and accelerate your way round 6 different tracks having selected the skid factor overall speed and number of laps before the off. Oil patches can be splashed about for less friction but added fun.

There are four cars on the track with the 64 controlling 2 or 3 depending on how many human are playing!

all you have to do is steer and change gear.

Having blustered your way to victory, with 'Congratulations' still ranging in your ears its time to enter the Hall of Fame spelling your name with the aid of another car. Rollicking fun for those of you out there who get bored with the Scalextric getting bent and buckled all the time.

Chartbuster
Commodore 64
Alligata
Price £9.95

Presentation	▪▪▪▪
Skill level	▪▪▪▪
Interest	▪▪▪▪
Value for money	▪▪▪▪▪

Devastatingly good value, comprising five games on one tape loaded they all loaded!! Digger is a 3d screen Platform indulgence. Collect all the keys and open the safes and each and every time.

After Work has you flying a canoe around a cavern popping light bulbs avoiding walls and chasing objects which leap up from scattered pools. Purple ducks and bouncing bombs populate the tricker levels. A really good game.

Parrc Planet is straightforward var

son of the arcade classic. Dig holes and ditch the red monsters when they follow. Take too long about it and they leap out and change colour.

Eagle Empire sends flocks of phoenixes and waves of eagles to do battle with your space ship before you get to topple the emperor in his egg for tress harmless fun for zippers.

Bug Blaster is a pseudonym for Centipeed and is as good as any I've seen with hordes of invertebrates to torment you.

Frenzy
Commodore 64
Micro Power
Price £6.95

Presentation	▪▪▪
Skill level	▪▪▪▪
Interest	▪▪▪▪
Value for money	▪▪▪▪

One of Six has surfaced again, this time with the entitled support of 'A Winter Studio of Pale' Completely out on my own sensawotsi the player guides a manic stick within the last 5% of tree screen or better still drowning the mind sod with a flood of colour.

There are two modes of progress slow (green) and fast (red), the former worth more points Each time contacts a mode with the screen edge or previously constructed tree. Emigo! the col

ouring routine shades in the captured are Of course, should the whinging wand clobber you during mid tree you lose a life so it pays not to be too greedy. But of course it's no fun if you're not! On large screens 'perimeter chasers hunt you and the pricks multiply. The lure of this game is inexplicable, it's ridiculously simple and yet totally absorbing. You really should love this in your collection!

Hooper
Commodore 64
Calisto
Price £7.95

Presentation	▪▪▪
Skill level	▪▪▪▪
Interest	▪▪▪
Value for money	▪▪▪

Yet another game chopped up re hushed and served up as something new A split second after the first byte has been transferred to the accumulator, I sussed that this game was a direct descendant of Crazy Pewter that's the game where you dash round a grid colouring in the squares whilst performing your skill in avoiding the oculour meanies selected from the day's menu.

A supple wrist is essential or farking that, Paul Daniel's fingers last 20 of

them!! If you must use the keyboard then of course, should the whinging Rondo à la Turke not easy Wolfgang Amadeus

This variant has you collecting only beans as a reason a life. Competent with deep reserves of tribulations to sift your skill through six screens with eight speeds, but not the best available So what's the point of doing it? More originality less repeating of old ideas please, software houses

Choc-a-Bloc Charlie
Commodore 64
Lothlorien
Price £6.95

Presentation	■■■■
Skill level	■■■
Interest	■■■
Value for money	■■■■

Reputedly there are 16 levels of play in this two-screen super toughie. This set-up is like Pengy but the plot is indi-vidual. Our climb is trapped in a wire-horse. To ease he needs to create his own bonus ramps which then deal in a host of useless white squares.

Isolated blocks may be pushed aside whereas others can be given little help treatment. The course of action is ener-gy draining as is contact with those droids carelessly released on moving the purple pieces of Lego.

Obviously they need penning in or avoiding, as do the time bumps left by the ultra helpful resident menace.

Gold blocks may be pushed through your exit for bonus points prior to your departure to the kind or whirly wheels.

This tricky blighter is a real head scratcher my progress was painfully slow, excuse me while I practice for ex partysorly

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Strike Force
Commodore 64
Bubble Bus
Price £6.95

Presentation	■■■■
Skill level	■■■
Interest	■■■
Value for money	■■■■

The title page depicts a tank and for some unknown reason plays the theme from Mash. From then on you are inside the tank looking out along the gun barrel, accuring the horizon by scrolling the screen at will. Although the Ballistic trajectory of your fire is not as convinc-ing as Beach Head or 3D Tanx the same laws apply effectively you control the height at which your shells explode via markers, as well as their direction.

In the first wave scouring helicopters have to downed as they chatter across

the mountainous landscape. These are mainly paving the way for a bomber raid on your base engage hostile icons on screen two. Assuming their bombs haven't nullified your defensive capac-ity you get to take on enemy vehicles in the final stage, as they swarm through your HQ, scroll, search and destroy

The difficulty levels (6 factors is set) may be firmly typed to taste. Graphics and sound are ok just not on the same peak as Beach Head

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Warlok
Commodore 64
Callisto
Price £7.95

Presentation	■■■■
Skill level	■■■■
Interest	■■■
Value for money	■■■

OK, you're a Scramble fan but feel the old timer needs revamping to present a fresh challenge. Well Warlok has bitten off chunks from its familiar fordbar, thoroughly cleaned them up and repri-grinted a highly interesting spin-off!

Up to four stages can be selected (I certainly don't pretend to have mas-tered them) with hazards presented at heavenly enough from Scramble to war runt as devotees lurching out to grab a copy

Min mazes genided by bipping taser

screens glittering bouncing cannon balls (space spiders?) dangling from threads and indestructible droids are some of the delights that await you in the cavern. And, yes energy has to be supped in the time honoured fashion

The graphics are not from the very edge of innovation but from what I've seen so far they deserve the thumbs up before the thumbs down as a but no "Dance of the Sugar Plum Fairy" or similar to sooth the troubled brow

---

Cave Fighter
Commodore 64
Bubble Bus
Price £6.99

Presentation	■■■■
Skill level	■■■■
Interest	■■■
Value for money	■■■

By allowing yourself the luxury of 98 lives, it is possible that all the 31 pre-selectable scrolling caves will reveal their secrets to you. I suppose this is a ledge, as opposed to a platform, hop ping game

There are ropes to climb, leaps to be made and 'il alien cavern-creepers to startle (well, amaze) you. A primodere-ter, activated by the fire button controls the height of your leap, an important consideration in regions with restricted head-room

Danger areas to avoid are rock pools, jagged edges, creeping jaws scouring the ropes and conglomerations of spar ing alinas Some of the tight squeezes appear to allow one pixel width for error Precision is the watchword As you would expect, the cave layouts get progressively tongher, while in each case the proliferation of the nasties in en tirely randomised "Chewors of Fire" and various squeaks are processed by the SID chip in this chunk of addictive entertainment

---

Tazz
Commodore 64
Bubble Bus
Price £6.99

Presentation	■■■■
Skill level	■■■■
Interest	■■■■
Value for money	■■■■

Bug blasting has proved to be a rich vein for programmers, this latest nugget to be mined is slightly different from the norm Your alter ego is dumped in a succession of ten rooms each well peppered with mini bugs and mega bugs, very mobile sprite nasties whose behaviour, form and tempera mentvary with each cubicle

Umpteen rounds of ammo plus a re newable arsenal of smart bombs are at your disposal, giving you the wherewit-hal to vaporise everything obnoxious before the advancing walls wreck havoc

with your overall dimensions! After clearing each second room, up pops a bones screen, digits and bombs to col lect, bet again beware of the marching minions!

A good blast em-away with an extra edge of your seat, nightmare add on Should you find it all too easy there are wother ten super rooms to tingle with So keep your thumb on the button and your eyes on the screen if you don't want to end up as fly meat! Good fun but with no new ideas. Are screen zap pers bothered?

61

Kokotoni Wilf
Commodore 64
Elite
Price £6.95

Presentation	■■■
Skill level	■■■
Interest	■■■
Value for money	■■■

Highly individualistic, offbeat — weird even - according to your viewpoint. Working your way through time zones is a sure-fire interest grabber as is the challenge of mastering the idiosyncrasies of leathes powered flight. But performing just one task repeatedly could miss the game's boon.

You have to flutter hundred a four-way scrolling obstacle course avoiding the touch of just about everything anime in otherwise while endeavouring to snatch a complete set of talismans, this

being the key to the next epoch. Their increasing strange about fluttering is around the statuesque dinosaurs (only the small spaces move) but this can be accepted as "video game logic". Quite apart from the wild world on the surface there are two tiny caverns aplenty most of the right squeezes seem virtually impassable to my but previous the flyers.

If you are dedicated enough then there is plenty of scope to stretch your wings.

Jinn Genie
Commodore 64
Micromega
Price £8.95

Presentation	■■■
Skill level	■■■
Interest	■■■
Value for money	■■■

An Arabian Nights style, four part potboiler. Being the one you can finally has an imprisoned sage from the custody of an evil genie there's some travelling to do. Devils lurthe in your flying door mat, the though naturally you can vaporise them.

After landing at the Genie's palace an open window has to be found. The guest whistle dodging about a maze, eluding the guards and trying all the windows. Once inside, all the torches have to be lit though guests meet on the crest live of the game

spider (there's always one!) who may send you reeling. With the aid of your stun attack the brightness finally shines forth revealing a magic jar, into the Genie's den you drag the jam, whereupon you discover the prisoner and lay put the three together to free the Wizard. The graphics are feeling enough and you do get a helping of stars. Eastern music. After two games in level the one I left pondering why such a lot of effort had been expended producing the game.

Jet Power Jack
Commodore 64
Micro Power
Price £6.95

Presentation	■■■
Skill level	■■■
Interest	■■■
Value for money	■■■■

We could soon be knee deep in Jim Pack games, so choose well care. The example is entirely descent from Rocket Roger (the other newer) even the "feel" of the snapstack thruster is different if you haven't used the jet, tale has described there's gruesome galactic gargoyle should opaque and boop out incommunicado in a space garage. but of course where else?

By welding the thruster controls to your own will, Jack will pass with facility through a screenful of bone-shatter

ingly sharp-edged wells, electrified gastrage fittings, stains, generally storming up and down like crazy with still more cussedly bobbing about at a slower rate at knots No zapping allowed as you attempt to ferry a fuel pod to stoke up the fires in your escape craft. There a very little safe ground and a scant one min ute a supply of oxygen.

Any room may be selected, so you can log gingerly through all five gauntlets at will. Not my favourite game but hard to fault.

Ankh
Commodore 64
Beyond
Price £8.95

Presentation	■■■■
Skill level	■■■
Interest	■■■
Value for money	■■■■

Subscribers to the theory of a parallel universe may well find food for thought here.

In theory, your conscious, elemental being has been encapsulated in a module which harshly totes a gun and a re-incredible probe, you guide the sensor package through 64 rooms trying to unlock doors, defuse traps, accumulate treasure, pick up tools and generally ponder the nature of metaphysical reality. Experience, both inward and outlet will equip you to make progress as will

the occasional sharp shooting.

Could this be thought of as an archetypal Adventure Genie is a pixelized, pure state? Perhaps. At any rate the interest will last as long as the esoteric conundrums haven't yielded to your diligent, inspired exhminations which in most cases will equate with euros

Be warned!... this is a puzzle... not a game

● Turn to page 73 for your chance to win a copy of this exciting game!

Mr Robot
Commodore 64
Beyond
Price £8.95

Presentation	■■■■
Skill level	■■■■
Interest	■■■
Value for money	■■■■

First master machine node, then study games design, mapping in the platform idiom and you will be all set to produce "I was maned thine't double" You need to trouble as expended to Mr Robot is a factory where creating testing courses to level-hoppers is as easy as well, pressing the fire button At the foot of the screen are all the units needed to conjure up an arcadian's dream. edit and position the building blocks with the cursor. Your brain child may be played nd reumen but only disk user can save the extra screens for posterity

The game itself features 22 screens - from "getting started" to "in theory it can be done" - classic, fiend-skeltan gathering from inaccessible ledges Features? Greasy poles escalators trampolines (good bounce simulation here), energised pills, bombs, laddes (naturally), treadmills et al Patrolling the ledges are fiery allers which need extinguishing that just leaves the transporton modules to mastm.

Good, brains use of colour plus the ability to select any screen makes this a bumper fun package.

CREATE SUPER VIDEO GRAPHICS

Menu selections on the screen can be conveniently displayed while the graphic is being created. In this way, the user will not lose sight of the drawing by constantly switching back to the menu, as in most touch pad products. For exhibiting or reproducing your completed graphic, the menu and cursor can be eliminated from the screen with the touch of a button

The "Expert Menu" adds a variety of computer automated features such as circles, boxes, rays, lines, and copy among others. A "Files Menu" allows the user to save pictures and retrieve them from a stored data bank. This command supports disk and tape storage

£59·95

FOR THE CBM 64

Until now, creating computer graphics in colour has been both a demanding and expensive endeavour. The "Super Sketch" Graphics Tablet provides a totally unique and simple medium for creating video graphics at a surprisingly low cost

By simply moving the stylus control arm, as you would a pencil, Super Sketch reproduces the movement on the video screen. Four control buttons at the top of the tablet assist in operating the graphic functions of the software. Graphics may be created by "free hand" or by "tracing" from drawings clipped to the pad.

Compared with other computer graphic products, it is much easier to use than keyboard controls, does more than joysticks, paddle controllers and mouse controllers, and is less expensive than touch pad products.

Comes Complete In One Package

Included in each package is all you need to create super graphics. A software cartridge is included in each page along with the Super Sketch controller pad (as described on the package). Also included is a comprehensive instruction manual and a "Starter Kit" that consists of several drawings that can be traced from the pad.

MUSIC 64 — COMMODORE 64

Not just another music program, this one actually calculates the exact pitch of each note to produce an even-tempered scale over seven octaves.

Lines 50 and 60 take care of this. By altering the value of 'c', the 'instrument' can be tuned to match your guitar or piano!

The music is stored in Data statements read by lines 100-160. The information is stored in the Data statements from line 400 on, and each item is structured in the following way, to make it easy for you to make up your own music.

Each Data statement can contain any number of items, as long as they don't exceed the 64's limit of 79 characters. Each item should contain nine characters excepting those for defining voice/tempo changes, for example, line 434, which takes the form (waveform 1...3(, new tempo /10):) three for each of the three voices. Where a voice is not required to play, the relevant three characters are filled with 'x's. This is largely to assist you in entering the correct number of characters per data item.

This is intended as an 'experimenters' program, so be prepared to experiment to get the results you want. Have fun . . .

by Peter Bartley

```
9 REM**********************************
10 PRINT"[CLR][CTRL][CTRL1]":POKE53281,12:POKE53240,11:A=4*"1WNT1:GR311L BRN]L
BLU1[CYN1L RED11EL11BRN1[BLU]1PUP1[RED1 GR11BRN1 BLK1"1FOR1=1TOCOSTE8 1
11 POKE0+1TO1+1,PRINT[LEFT$(A#,3)"':CRI16)1ACN-64 STYLE1[CU]"1FOR"=1TO20:NEXT,Z
1PRINT
12 NEXT1FOR1=1TO2000:NEXT1PRINT"1[CD11YE116:7:TRANSLATED 1D THE '64 BY 1G>1PIETER
10>P1[D:BI=#ILEY'
13 FOR1=1TO2000:NEXT1PRINT(1AB17)"1REDIAN#1FOR1=1TO20000:NEXT
14 AR1HE"1[DE11O:BIED1C4TED TO THE STAFF OF 1PUR:11DJ1G1OMMODORE 1GUJSER'
19 REM**********************************
20 DIM*(1(,2),B*12,6)1F*2218*1C:R=111*X1'0'o1*X0'1FZ21001N*170
30 SWS4270:SI*S*1152*R=4153*5:'1S4*S*9195*83:11S4*S*1415*5:"S4*S13S=S+18
40 FOR*=0TO91POKES+*,01NEXT
50 FOR1=1TO12IF*0TOHC=$7*43/2*(115*1/12):3
60 F11,I1=INT(C/2$611$):X*C=264*A*!,F1:10NEXT,1
70 POKES*5,42:POKES+6,48:POKE5*12,106:POKE5*19,"4:POKE54,20,51
80 POKE54,24,15
90 POKES*2,0:POKES*9,0:POKES+16,0:POKES*5,10:1POKES*7,1
100 READA*1:IFLEH$A="TNENEN
110 IFA#="1END"TNENENE
120 WNV4L(A#):P%=J-INT(M)*X1PM#/Y1W=U-INT(O1#Y1R=W/Z1N=(M-INT1R)8Z1#1D1DGT0
100
130 E#=VAL(LEFT$(A#,3)):E=VAL1MID$(A#,4,3)1IF#=VL(RIGHT$(A#,3)1
150 IFTDTHENPOKES,P:ED=D1DZ=E-108:INT(E1)
150 IFTHENPOKES,O:E1#E/10:E2=E-108:INT(E1)
160 IFF1#HENPOKES,#,F1,F2:1POKES7,A:F1,F2:1POKES8,M+1
200 IFB*0THENPOKES,0:B1,B2:1FOKES1,A1$1,D21POKESS,M+1
210 IF1OTHENPOKES3,O:1,B11AOKES1,A1E,E21POKES5,M+1
220 IF1THENPOKES*6,F:F1,F21POKES7,A1F1,F2:1POKES8,M+1
300 FORT=1TO4:NEXT:GOTO100
400 DATAXXX114XXXX,XXXXX,XXX,113XXXXX,032XXXXX,03211*113,042XXXXX
402 DATAA20X*113,002XXXXX,042XXXXXX
404 DATA1013,10200X*113,112XXXXXX,113XXXXX,032XXXX,11311#034
404a DATA1#220XXXXX,032XXXXXX
406 DATA042211X614,062104XXXX,082104-10,063114034,042XXXXX,01#2084044
412 DATA04211#X#,XXXXXX,012XXXXXX,063104-10,103XXXXX,012XXXXX,042104044
414 DATA042211#,013XXXXX
414 DA*14C32114-10,113XXXXX,082XXXXXX,0321140X*,042XXXXX,042114044
419 DATA022XXXX,012X-XXXX
420 DATA062X11#204,112XXXXX,103*XXXXX,0%,062XXXXX,022XXXXXX,11311#034
422 DA*1601200XXXX
424 DATA08#114034,042XXXX,032A44054,012XXXXXX,113XXXXX,0*3044-15
430 DATA11#XXXXX,120040XXXX
432 DATA08#1120XXXX,042XXXX,0*X#XXX,032XXXXX
434 REM
434 DATA032113114,XXXXX104,04211#034,062012104,XXXXXX044,032110114
440 DA*10#211#300X,032063104,032XXXX14
442 REM
444 DATA32644417
446 REM
448 DATA062206304,013-10XXX,032XXXXX,103XX-10,113XXXXX,012XXXXX
452 DATA062204204,013-10XX,103XXXX,043XXX#,103XXXX,012XXXX,042004XXX
454 DA*0121004XXX
462 DATA032114114,XXXX044,032XXXX,042XXXX,042XXXX,042114084
458 DA*0820XXXX,042XXXXXX
460 DATA042211#,XXXX-10,XXXXX0,112XXXXX,012XXXXX,042XXXXX,11311#084
462 DATA062XXXX,032XXXXX,012043044
464 REM
466 DATA022*#0409
468 REM
470 DA*093XXXX41F,042XXXXXX
472 REM
474 DA*632644417
474 REM
476 DATA032063044,012XXXXXX,113XXXX\X,063043044,113XXXXXX,103XXXXX,113033114
480 REM
482 DATA042*#4466
484 REM
486 DA*1XXXXXXX,XXXXXXX,10-10-10
488 DATA-10-10-10
490 DATALEND
```

69

Package tours ain't what they used to be. According to Simon Veryard, you're on holiday on the Planet Thorn, a place famous for its rocket rides. Unfortunately, just like everything on holiday, they cost too much money.

But help may be at hand in the form of money bags falling from the sky. More explanation? Well, the crooks that robbed the local bank forgot to close the hatch of their getaway rocket — sounds reasonable.

You need to collect ten bags to pay for a rocket trip. Oh, and don't forget to avoid the killer Thunder Bolts and the Cyclops — citizens of the planet who don't like the idea of you frittering away their hard-earned savings when they'd rather spend it on a trip of their own. Pressing a key makes your man move to the left. If no key is pressed he automatically moves to the right. The more ambitious can speed up the game by adding extra SYS 674 to line 150.

The program loads in two parts: type-in and save them separately. Then load and run the first part before loading the second.

by Simon Veryard

Part One

```
0 REM ***************
1 REM *               *
2 REM * UREKA  1984   *
3 REM *               *
4 REM * BY :- SIMON    *
5 REM *               *
6 REM *   VERYARD      *
7 REM *               *
8 REM ***************
9 REM
10 FORI=7168TO7679:POKEI,PEEK(25600+I):NEXT
15 FORT=674TO757:READA:POKET,A:NEXT
20 FORT=0TO9
30 FORI=7168+(8*T)TO7168+(9*T)+7
40 READA:POKEI,A:NEXTI,T
50 POKE56,28
100 DATA 162,0,189,118,31,157,96,31
101 DATA 232,224,110,208,245,162,255,189
102 DATA 52,30,157,74,30,202,224,255
103 DATA 208,245,162,52,189,0,30,157
104 DATA 22,30,202,224,255,208,245,169
105 DATA 7,174,60,3,157,73,31,165
106 DATA 197,201,64,208,15,169,0,232
107 DATA 157,73,31,224,22,208,2,162
108 DATA 2,76,242,2,169,1,202,157
109 DATA 73,31,224,1,208,2,162,21
110 DATA 142,60,3,96
111 DATA 8,29,9,78,72,120,8,255
112 DATA 16,184,144,114,18,30,16,255
113 DATA 203,203,170,0,2,135,183,255
```

70
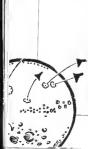
```
114 DATA 60,24,102,239,199,239,195,126
115 DATA 129,195,102,60,24,126,60,24
116 DATA 66,36,60,90,126,102,60,102
117 DATA 219,231,219,255,255,24,36,126
118 DATA 0,0,0,0,0,0,0,255
119 DATA 24,60,126,171,213,255,255,231
120 DATA 60,60,126,255,231,66,36,24
200 POKE36879,25:POKE36865,160:POKE36869,255
215 PRINT"[CLS][REVI][BLK][CR][GRN]UREKA [BLK]- VIC 20 3.5K"
220 PRINT"[REVI][PUR][CR][150(U]"
225 PRINT"[REVI][RED][CD]YOU ARE ON THE PLANET THORN COLLECTING MONEYTO BUY YOURS
ELF"!
230 PRINT" ROCKETRIDES AROUND THE ULTRASPACE''"
235 RRINT"[REVI][CD][BLK]BEWARE'' [RED]THE PLANET[3SPC]RAINS KILLER THUNDER[2SPC]
BOLTS, AND WATCH OUT ";
240 PRINT"[REVI] FOR THE MUGGER CYLONE."
245 PRINT"[REVI][7CR][12Q<@]"
250 PRINT"[REVI][BLK][2CR]F[RED][4CP][G<@][OFF][CYN][REVI][RED][9SPC][G<M]"
255 PRINT"[REVI][BLK][2CR]R[RED][4CP][G<@][G<@][OSPC][G<N]"
260 PPINT"[REVI][BLK][2CR]E[CR]K[RED][2CR][O<@][7SRC][OFF][GRN][REVI][RED][2SPC][
G<M]"
265 PRINT"[REVI][BLK][2CR]S[CR]E[RED][2CR][G<G][OSPC][G<M]"
270 PRINT"[REVI][BLK][2CR]S[CR]Y[RED][2CR][G<G][OSPC][O<M]"
275 PRINT"[REVI][7CR][G>]L[BLK][5G<@][OFF]A[REVI][4G<@][RED][O:@]"
280 PRINT"[REVI][BLK][2CR]A[RED][4CR][12G<L][G<G]"
285 PRINT"[REVI][7CR][2D>]L[OFF][2][REVI][7D>]L[1G<O][HOM]"
290 FORT=1e0T038STEP-1:POKE36865,T:FORI=1TO30:NEXTI,T
300 GETA$:IFA$=""THEN300
305 POKE36869,240:PRINT"[CLS]NOW LOAD MAIN POGAM."
```

Part Two

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micronet 800

See Micronet 800 in action.

This somewhat vague documentation that Commodore supplies with its product's leaves the field wide open for independent authors. The disk drive manual is a prime example. So it's not surprising that enterprising authors should try to bridge the gap.

A brief introduction is followed by a chapter on powering up, although it does not include multiple connection of disk drives and printers.

Chapter two describes the construction of a diskette with the aid of an exploded diagram, and offers good advice about their care and maintenance. Following that, the Basic disk commands LOAD, SAVE and VERIFY are explained in detail together with pattern matching, and the example supplied on the Demo disk.

All the disk maintenance commands are explained, but the examples tend to be no better than those in the original manual, and are so embedded in the general text that they are difficult to identify at a glance. The authors give a warning about using the SAVE and REPLACE option of the SAVE command. They claim that there is a bug which may corrupt the disk (perhaps Tommy could comment on this).

The next three chapters cover Sequential, Random Access and Relative file systems. Error checking and the use of the status variable are introduced with short program examples as are reading and writing files. A very useful subroutine is given to change floating point numbers into strings to reduce their storage space on disk.

The chapter on Random Access files details the mechanics of reading and writing to specific areas on the disk, and mentions that a Sequential file is required to keep track of the records created. Unfortunately no detail is given on how to create and maintain such a file.

The remainder of the book contains useful tables of commands, and comprehensive explanations of each error message.

Four useful programs are included to display the contents of a Sequential file, unscratching a SCRATCHed file, software write protection of a disk and changing the name and ID of a disk without NEWing it.

The book claims to be a simple guide to using your disk drive. It is basically a replacement for the original manual, and goes no further than explaining the workings of the disk. It will not help beginners to design file handling programs.

Ken Ryder

- The Commodore 64 Disk Book
- by Tony Hetherington and Gordon Hamlet
- Century Publications
- £5.95
- Ian Sinclair's book represents better value

The second of our brace of disk books is by Ian Sinclair. It is larger then the first, enclosing 114 pages. As a bonus there is also a section on printers. In common with the previous work this book starts with a description of the hardware and floppies, including the layout of tracks and sectors.

The LOAD, SAVE and VERIFY commands are illustrated with the use of the games disk, currently supplied free with the 1541. No mention is made of the bug reported by Hethington and Hamlet. A short subroutine to read the error channel is included together with a useful tip on how to load the disk directory without overwriting the program in memory.

Hexadecimal notation is clearly explained so that you can use the DISPLAY T&S program included on page 49 of the Commodore manual. Backup procedures lead logically to the file handling commands COPY, SCRATCH etc. together with the advantages of pattern matching.

The above mentioned games disk contains a BACKUP program, without any documentation! Mr Sinclair makes up for this deficiency by including instructions to this and the programs listed in the back of the 1541 manual. These games are priceless.

The concept of files is introduced generally, and concentrates on Serial files specifically. Short subroutines are used to demonstrate reading, and extending a Serial file. Random Access files are relegated to an appendix, but Relative files are covered in depth. Again useful subroutines are listed. The author admits that the routines are only for learning purposes, as a Sequential file is needed to keep track of Relative files.

Unlike the first book, the next chapter carefully and clearly describes a program which creates a simple database. The system uses two Relative and one Serial file. This program may be used as a basis for something more advanced.

The final chapter is devoted to printers, describing the various types available and any interfaces needed. The Epson RX80, Juki 6100, CGP-115 and the now discontinued Commodore 1515 are individually covered. Six appendices conclude the book.

This book is for beginners, it reads easily and explains everything clearly. Unlike the previous book it actually gets down to creating a useful filing system, but if you really need Random files then look elsewhere.

Ken Rydar

- Commodore 64 Disk Books and Printers
- by Ian Sinclair
- Granada
- £5.95
- Worth buying

To write programs that are actually useful and practical in the aim of this short book by Rudolf Smit. And very good it is too.

Despite the initial praise, I still feel a calendar on the loo wall and a pad on the hall table is less bother than loading a program into my 64 every time I want to check a birthday or telephone number.

The real strength of this book is not so much in its programs as in the ways they are planned and written. It is an excellent, readable introduction to structured programming with a short main line sequence and subroutines at second and third levels.

The subroutines are reached through GOSUB commands and RETURN sends the computer back to the mainline ready for the next subroutine. That is the basis of a structured program. It makes for programs that are easy to write and test, easy to follow and easy to update, alter and extend.

Don't let the apparent complexity fool you, a working knowledge of simple Basic is all that is required. How refreshing not to be told how to PRINT "HELLO" even for beginners, and need expect to have ready made expertise in machine code or video chip addresses. Down to earth, clear, practical advice on planning and writing useable programs that work. A welcome addition to my "in-betweeners" bookshelf

George Pike

- Commodore 64 Software Projects
- by Rudolf Smit
- Melbourne House Publishers
- £8.95
- A straightforward and clear introduction to designing and writing programs. A case of 'Small is Beautiful'.

Here's a program that converts machine-code into pages of Data statements of a Basic loader.

Datamaker is a machine-code program that automatically converts machine-code

into pages of Data statements. Feed in the information (the data will be printed on the screen) and press Return to enter each line.

After typing in the program, Save it (as

usual) as the slightest mistake could crash the machine. The routine is completely relocatable. For example, if your source-program is located at 49152 ($C000) then locate the Datamaker at

32768 ($8000), i e. change the Poke in line 120 from 53000 to 32768 or anywhere convenient. But remember to lower the top of Basic (Poke 56,32 in this case), otherwise any Basic

```
1 REM NC-DATAMAKER    BY M. C. HART
100 REM C-64 BASIC LOADER
110 :
120 FORJ=0 TO 169:READ X:POKE 53000+J,X:T=T+X:NEXT
130 IFT<>249579 THEN PRINT"DATA ERROR!":END
140 END
150 :
160 REM SYNTAX : SYSLOCATION;START,END,FIRST-LINE,INCREMENT
170 :
200 DATA32,1E9,173,32,247,183,133,252
210 DATA32,221,32,253,174,32,158,173
220 DATA32,247,183,133,254,172,32,172
230 DATA253,174,32,275,187,174,1,165
240 DATA20,133,162,165,21,133,164,167
250 DATA0,173,86,168,147,32,210,255
260 DATA166,167,167,164,72,205,188,167
```

program will overwrite your Datamaker.

The program requires certain information to be able to carry out your wishes. It has to know the Start and End addresses of your machine-code

```
270 DATA22,70,210,205,167,40,32,210
280 DATA255,165,172,33,210,255,160,0
290 DATA32,87,177,251,170,162,32,205
300 DATA165,230,251,208,5,230,252,145
310 DATA4,177,251,201,208,7,54,165,253
320 DATA205,251,144,61,200,57,165,97
330 DATA20,240,5,165,44,32,210
340 DATA255,165,0,240,213,32,215,170
350 DATA165,245,2,201,162,177,167,144
360 DATA32,227,164,230,59,165,25,2,1
370 DATA20,208,165,52,215,,70,165,25
380 DATA165,252,33,70,7,105,165,59,70
390 DATA251,205,215,105,,3,165,165,205
400 DATA165,177,215,151,57,54,,44,,
410 DATA78,07,7,7
```

program. It needs to know the number of the first line you want to create, and the line increment (usually 10). This information is contained within a SYS command with the syntax: SYS (the

location after the POKE in line 120) Start address, End address, First line number, Line increment (Return).

For example, to convert a machine-code program, located at 49152 ($C000) to 53247 ($CFFF), to start at line 1000, with an increment of ten, enter the following SYS(32768)49152,53247, 1000,10

The program should produce a full page of Data statements, with a pair of numbers at the bottom. Press the CLR/HOME key (unshifted), and press Return until the cursor sits below the last Data line. This enters the Data statements in the same way as if you had typed

them in.

The remaining two numbers indicate the next Start address, and the next line number respectively. Enter them in the next SYS command as before, until the READY message indicates that all the Data statements have been created.

To turn these Data statements into a proper Basic loader, add the following lines:
10 FOR X = (start address)TO(end address):READ A:POKE X,A:NEXTX
In line 20, you could insert a SYS command to start the routine, or a message, "PLEASE WAIT".

by Mike Hart

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How we reproduce listings

We have two methods of presenting listings. Where we can, we run them through a convenient program that replaces the hieroglyphic control codes with more meaningful symbols.

When you see	It means...	And you...
[CU]	cursor up	press the cursor up key (shifted)
[CD]	cursor down	press the cursor down key
[CL]	cursor left	press the cursor left key (shifted)
[CR]	cursor right	press the cursor right key
[HOM]	cursor to the top left hand corner	press the HOME key
[CLR]	clear	press the CLR key (shifted)
[DEF]	change to normal	press the INSert key (shifted)
[BLU]	change to blue	press the BLUe key (CTRL and 7)
[WHT]	change to white	press the WHiTe key (CTRL and 2)
[RED]	change to red	press the REDkey (CTRL and 3)
[CYN]	change to cyan	press the CYN key (CTRL and 4)
[PUR]	change to purple	press the PURple key (CTRL and 5)
[GRN]	change to green	press the GReeN key (CTRL and 6)
[BLC]	change to black	press the BLacK key (CTRL and 1)
[YEL]	change to yellow	press the YELlow key (CTRL and 8)
[RVF]	reverse on	press the RVS ON key (CTRL and 9)
[OFF]	reverse off	press the RVS OFF key (CTRL and 0)
[SPC]	space	press the space bar

When you see any of the codes prefixed by a number, you must press the appropriate key the same number of times

for example

[3SPC] means — press the spacebar three times

or

[5CD] means — press 'cursor down' key five times

[G:key] press specified key together with CBM key
[G:key] press specified key together with CBM key

These listings we generally run on a letter quality printer, though, and conventional graphics can't be handled on a daisywheel. So some listings are done on a Commodore printer, in which case you may see the standard control codes.

SPARKLE — FOR THE UNEXPANDED VIC 20

This little gem (sorry) produces a sparkle effect guaranteed to brighten up any screen.

It's quite a clever technique, too: POKEing random numbers into the re-defined graphic area of memory (7168 to 7679) produces the effect reminiscent of explosions or shimmering prizes.

Line 5 defines the graphics, line 10 displays them on the screen. Line 15 performs the sparkle operation, and line 20 sets an original defined character (the famous 'smiley face').

by S. Johnson


```
5 PRINT"[CLR]":POKE52,28:POKE56,28:
CLR:FOR I=7168TO7183:READ A:POKE I,A
:NEXT:POKE36869,255
10 GOSUB1TO50:Q=INT(RND(1)*505)+7680
:POKEQ,0:POKEQ+30720,4:NEXT
15 FORT=1TO20:FORS=7168TO7175:POKES,
INT(RND(1)*255)+1:NEXT:NEXT
20 FORS=7168TO7175:POKES,PEEK(S+8)
:NEXT
25 POKE36869,240:END
30 DATA60,66,165,129,129,165,153,66,60,60,
66,165,129,129,195,66,60
```

READY.

User-friendly design—Part four

Tying up the loose ends

by Chris Preston

In this last article in our series on User-Friendly Design, we are going to consider all the other 'little' things which go to make up a good program. 'Little' is in inverted commas because, as you may have noticed, these 'little' things sometimes take an awful lot of programming — which is why they tend to get neglected.

The 'Blank Screen' Syndrome

Never, ever, leave the screen blank. You should always tell the user that something is happening, even if you don't always tell him or her what it is — a user might be quite happy with 'WRITING RECORD TO DISK' but get a little worried about 'CORRECTING SOFT ERROR', or 'RETRYING FAULTY SEEK OPERATION' so we tend not to give too much detail about them, even though they happen all the time on any disk drive. Basically, the user just wants some confirmation that the machine is doing *something*.

A little more subtle than the Blank-Screen Syndrome is the nasty habit of not showing any change on the screen after a key has been pressed (selecting option 5 on the menu means that the program has to spend five seconds calculating before displaying the result, just a message on the screen saying 'CALCULATING DEPARTMENTAL TOTALS'. Otherwise our impatient operator is going to keep on pressing the '5' button muttering "Come on you [expletive deleted] machine" and then have to wait for 50 seconds while the obedient computer calculates the totals ten times over.

Which brings us to our next topic.

Don't clear the keyboard queue

On all the Commodore machines there is a keyboard queue which allows the operator to 'type ahead' that is, to enter data on the keyboard faster than the program can accept it.

Some programmers gleefully put a spanner in the works by clearing the queue every time the program comes to a new menu; which in effect disables that facility. You can argue that this makes it easier for the first-time user to use the program, because he or she doesn't get confused if two keys are pressed by mistake. But you should remember that a first-time user is only a first time user once, and after our user has

"HE'S BEEN LEFT WITH A BLANK SCREEN"

Ken Pyne

got the hang of the program, he or she may want to settle all half a dozen keys and then take a mouthful of coffee while the program catches up.

Research into factory working procedures has shown that machine operators are much happier if they can work at their own pace, rather than being tied rigidly to the machine's timetable.

Being able to average 12 pieces per minute is much easier than having to do one every five seconds, even though it may boil down to the same thing in the course of a shift.

HELP screens

The information normally given on the screen should be enough for a reasonably experienced operator to use the program without any trouble. But these will always be inexperienced users and anyhow, from time to time everybody comes to a part of the program which is used only once in a blue moon.

So we need to be able to give people an extra hand. There is always the operator's manual, of course, but that is locked up in the blue filing cabinet and only Mavis has the key and she's off sick again.

So what can we do? Press 'H' to Help and hope that the program was written by a decent programmer. A proper help facility should tell the user, in some depth what options are available at that point in the program — whereabouts they are, what they do, and so on.

The information would really have to be held on disk or on ROM, as loading 20KB or so of text into cassette would take rather a long time so I suppose I'll have to relent for programmers running tape systems on a 3.5KB Vic.

Menus

A large part of the operation of any program, typically consists of telling the program what to do next — "Print a list of all customers names and addresses", "Enter today's invoices" and so on. These single key options are best handled by means of a 'menu' such as the one on page 87

SELECT ONE OF THE FOLLOWING OPTIONS:

1. UPDATE CUSTOMER FILE.
2. ENTER INVOICES AND CREDIT NOTES.
3. PRINT LIST OF ALL CUSTOMERS.
4. PRINT ADDRESS LABELS.
5. PRINT CUSTOMER STATEMENTS.
6. PRODUCE AGED DEBTORS LIST.
7. FINISH PROCESSING.

PRESS 1-7

> *WHAT TO DO—PRESS (R) OR PRESS (A) AND GO TO THE PUB?*

> FILE NOT FOUND

An Aged Debtors List, by the way is not a hit list for OAPs who don't pay their bills: it's a list of all customers who owe money. It is usually arranged in columns — '1 month', '2 months' '3 months' — so that the accounts department can see who the bad payers are

When the menu is on the screen the operator has to press only one key in the range 1 to 7 to move on to the next job — using the numeric keys means that the operator does not have to search the keyboard for the "D" key There are cases when we might use letters, especially "N" and "Y", but usually that only applies where we want the operator to stop and think (something you should normally try to discourage).

In a large program, there may be more options than will fit on to one screen. In this case we have to split the system up into a main menu and a number of sub menus

Handling disk errors

People are very fond of knocking CP/M, a famously enigmatic disk error message is "BDOS ERR ON A". To some extent this is unsatisfied, after all, what else do you need to know apart from the fact that a disk error has occurred on drive A? Do you really want to know that it is a read verify error on track 15 sector 3?

What is unforgivable though is the fact that the user is not given any chance to try again. You may have put an unformatted disk in the drive instead of the correct one, or, you might have put it in upside down, or, you could simply have forgotten to close the drive door

Many programs suffer from a similar problem "FILE NOT FOUND", they say, or "WRITE PROTECT ON" and they then just stop! After every disk error the operator should be told what has happened (but don't try to blind the user with science) and give the option of either retrying or abandoning the operation For instance

---

CUSTOMER FILE NOT FOUND ON DRIVE 1.

PRESS (A) TO ABORT, or < R TO RETRY

The operator can now make a choice — whether to give in and press < A >, or, put the right disk in the drive and press < R >. Notice that here is a case for using letters, we want the operator to think about what he or she is doing, and there is a danger from pressing the wrong one of two adjacent keys such as '1' and '2'.

This is also a case for cleaning the keyboard buffer If the operator has started to enter data beginning with an 'A' he is now going to be in trouble!

At this point some programmers may be starting to huff and puff and say, "Well that can't be done in this program because at the point where the problem occurs, the program doesn't know which particular file access caused the error". Or, some such feeble reason

If that is true, these programmers had better rewrite their programs — because they must be guilty as well There is no excuse for not being able to recover from an error because of lack of information All it needs is a decently-written program

Output

The output from a program may be displayed either on the screen or the printer The same considerations apply to both, so we'll assume that we are talking about printer output

The printout should of course have a heading at the top of each page saying exactly what the printout is and when it was produced For example we may have a program to print out data from our customer file A page heading would say 'CUSTOMER FILE PRINT' if all very well if the program is going to print out all the customers, but if we have a selective print, which prints out

only customers living in Reading who have expressed an interest in photocopiers, then the page heading (or at least the report heading) should say so Otherwise, somebody picking up the printout could assume that all our customers live in the Reading area!

The layout of the data is largely a matter of common sense If it is arranged in column format, then column headings should be printed at the top of each page. Numerical data arranged in columns should be formatted so that each figure has the same number of decimal places, and the decimal points should be aligned: (see above)

GOOD		BAD	
0.25		0.25	
1034.00		1034	
0.05		.05	
-1.40		-1.4	

The only other point worth mentioning specifically is that the report should be tailored to suit the person who is going to read it. If we have an automatic assembly machine turning out widgets, the production manager is going to want reports on product quality and quantity so that he can be sure that he is meeting his production targets.

If 20 per cent of his production is faulty, then he is going to have to get his maintenance staff to look into the problem.

The planning department on the other hand needs reports on the costs of running the machine — the cost of the raw materials used, cost of the electricity used, the maintenance costs, general staff and administration cost — as well as the production figures. They can also assess the total cost of producing a widget and to set the ultimate price.

But although the planning department wants to know the production costs, it is possible they wouldn't get a report cluttered up with various cost figures.

Summing up

A quick summary of the most

important points. Notice that the menu of items that have reservations do this but don't do this! It is part of the skill of programming to get the "this" right without falling foul of the "that!"

1. Make life so easy for the operator as possible. Don't assume that he is as good a typist as you, or knows as much as you.

2. Give the operator as many options as possible, so that he can make his own mind up about how he does his job, but don't offer unnecessary information which could confuse him.

3. Let the operator know that the machine is still working. Certainly never leave him with the dreaded blank screen.

4. Validate all input immediately and tell the operator straight away if he has made a mistake.

5. Make the program so easy to use for a first-time user that, even more important, don't hold up an experienced operator.

6. Don't force the operator to enter laborious bits which you could calculate yourself. If possible try to work out defaults for data fields (possibly based on earlier input) so that the operator can just press <RETURN> to accept them if they are correct. Now go to it and right some "good" programs!

WHAT TO DO - PRESS (R) OR PRESS (A) AND GO TO THE PUB?

FILE NOT FOUND

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A *STAB* IN THE BACK FOR BASIC?

An alternative language to Basic and machine code

by Andrew Collin

STAB is a programming language originally developed at Strathclyde University. One of its offshoots, STAB-1, is a language specially written for small computers. It's not only portable but it provides the ease-of-use of Basic with the speed of machine-code. STAB enthusiast Andrew Collin, who recently set up Talent Computer Systems, introduces the language and explains how Talent is using it to write games and utilities for the Commodore 64. You can't acquire it, though, for your own 64 — but that could change if there were enough demand.

If you own a Commodore 64, you won't need to be told how hard it is to program. If you're writing a small simple program, Basic will serve you well, but as soon as you start on anything complicated, or try to use the graphics and sound facilities on your machine, Basic just gives up. You're left with a mass of PEEKs, POKEs, and machine code routines which takes ages to get right, and even then your program won't run as fast as the professional stuff.

What's the secret? The wise old men of computing (actually they tend to be about seventeen, so let's say they're old in experience) will tell you that their programs are written in '100% machine code'. It's true that a machine code program knows no restrictions about what it can and can't do, and at a genuine way of getting the best performance from a computer, but have you ever tried writing a long program in machine code? There's so much painstaking detail to worry about, and so many pitfalls for careless mistakes, that the whole process is a return to slavery. Computers are supposed to get rid of mindless drudgery, not create it!

The solution to the problem is obvious once it's pointed out. We need a high-level language that is, one which allows expressive, variable names, subroutines, loop structures and so on) which also gives you full control of the computer and is capable of running as fast as machine code, and they would still run just as fast. Since you could now afford to throw away bad bits of program and rewrite them, your final product

might even be better than if you had wanted to write it in 100% machine code.

There are lots of computer languages around. The best-known ones apart from Basic are Fortran, Cobol, Lisp, Pascal and Prolog. Unfortunately these languages were all designed to run on much larger computers. They don't give you full control over the machine, and some of them run very slowly (even on mainframes). The chances for micros is much more limited.

When *Talent Computer Systems* decided to enter the home computer software market, we faced this problem in acute form. We had lots of ideas for new products, but — like other software companies — we were a bit loath to ask genuises to turn them into finished products. Fortunately we had good connections with the Department of Computer Science at Strathclyde University, where they have been doing research on

programming methods for a number of years. One of their products is STAB-1, a computer language specially written for small machines. This language is portable, which means that you can easily run it on any computer you like.

Looking at STAB

What is STAB-1 like? At first glance, it's quite similar to Pascal. You can call your variables anything you like, and the names have limited scopes — which is the Computer Scientist's way of saying that the names only have any meaning over a restricted part of the program. This last helps enormously with building large programs, because two or more modules can be stuck together without worrying about the fatal name clashes which so often arise if you try to do the same thing in Basic.

Another feature of STAB is that programs split naturally into pro-

cedures, each of which does one simple, well-defined job. The procedures talk to each other through a system of arguments or parameters, a bit like the well-defined functions in Basic. The key difference is that in STAB the procedures aren't limited to one line but can be as long as you like. A procedure can call another procedure. It can even call itself, which lets you use recursion.

Also, STAB is especially well adapted to handling peripherals. The way it does this is very simple. One of the 'data types' in STAB is called CHARVEC. That's not complicated, it's just (like an array in Basic, except that each element is a character (or a byte) rather than a number. That's no limit to the length of a charvec, and it's quite easy to declare a charvec which covers the whole address space of the Commodore 64. You can then refer to any peripheral register just by using the right subscript!

Procedures with STAB

To give an example, consider the following section of code, which copies some character definitions into the RAM at address 12288. The Basic instructions are taken from the Commodore 64 Programmer's Reference Guide, page 110:

```
20 POKE 56334, PEEK(56334)
   AND 254
30 POKE 1 to 511: POKE 1+
   [ 2288, PEEK(1+53248): NEXT
50 POKE ), PEEK(1) OR 4
60 POKE 56334, PEEK(56344)
   OR )
```

The corresponding list of STAB-1 might be

```
routine copychars charvec source charvec destination
  lat t,p:=.56354
  [ memptr dest := memptr
    mem(1) and .25l := mem1]
    do t := 0(1).5l1 memsource+t!:= > mem(destination + t)
    memt! or t := > memptr
    memptr or ! := > memptr
```

This is an example of a procedure. It might help to understand it if we mentioned that decimal numbers are preceded with a full stop, numbers are assumed to be in the scale of 8). The shrunkmark is a subscript operator so that memt means roughly the same as MEM(Q) in Basic. Finally, := means "assign". Assignment statements are written the logically correct way—work out the expression on the left, and then put it into the address on the right. Most people would say that STAB arguments are written backwards, but then most people have been brought up on illegal languages!

The procedure does nothing by itself. When called, it will move 512 characters between any two places as defined by the parameters source and destination. If you actually want the characters to be copied from 53248 to 12288, you would write a routine call like copychars(.53248,.12288).

The second way that STAB helps you control the machine is the provision for handling interrupts. You can write you program to include a special routine or network of routines; and you can arrange for that routine to be called automatically every time an interrupt occurs—for any reason. There is no need to write any machine code at all!

To give you a little more of the flavour of the language, here's a complete program to calculate and print prime numbers, using the method of Eratosthenes' sieve.

```
! Prime numbers by Eratosthenes' sieve
  charvec sC.5000)
  routine pr x ! Display value of x
    if x > 9 then [pr(x/.10)/printch(x rem .10+'0')]
    routine main
    let [k :=
    2) := >
    while [ <.2500 repeat !
      if s[ = 0 then !
    2*j := > s
    while k <.5000 repeat [! := > s[k[ k+] := > k ]
    !+1 := > j
  !Now print out numbers where the elements of the
  !sieve are still 0
  do j= 2(1).4999
    if s[j = 0 then [pr(j): printch("L')]
  nata.
```


developing and testing programs. The original program is always in the machine, and you can list it and change it whenever you like. Another advantage is that programs in Basic tend to be compact, so that not much memory space is given over to storing them.

On the other hand, these benefits don't come from The interpreter has to analyse every statement every time it is obeyed, so that in the loop:

```
10 FOR Q=1 TO 1000
20 A=A+t/Q
30 NEXT Q
```

the command at line 20 is not only obeyed 1000 times, it's also analysed 1000 times; and of course the results of the analysis are the same each time round. This makes interpretation very slow, and the computer creeps along at about 1 per cent of its true potential speed.

The alternative to interpretation is compilation. Here the program is analysed once and for all, and translated into assembly code before it runs. The major advantage is that it will now run at a speed much nearer to that of machine code (not full machine code because computer based translation — conversion as they are called — are not as clever as human coders).

The corresponding disadvantages are many. First, the translated version needs to be bulkier, to take up more memory space than the original version of the program. Second, the compiler is a complicated program, and it is difficult to shoe-horn it into a computer like the 64 (it can be done, but it would run rather slowly). Third, program development isn't so easy because the whole program has to be re-translated if any of it is changed.

answer. Clearly, some parts of the program you are writing have to run as fast as possible to keep up with the outside world. Other parts, such as those which display screens or writing or accept typed input, have no special requirement for speed. It takes a normal person several seconds to read a screen, so it doesn't matter whether the screen appears in 1/1000 or 1/10 of a second.

STAB-1 lets you mix interpretation and compilation in the same program. When you write your program, you can choose the procedures to be translated into machine code so that they run fast. The others are interpreted and run more slowly, but then they take up hardly any room in the memory.

Would you like to get a STAB-1 compiler/interpreter for your Commodore 64? I'm afraid you can't, unless you've got a WICAT microcomputer The STAB computer has never actually been transferred to the 64. Instead, Talent does all its program development on the WICAT, a powerful machine with 256K of memory and a 68000 microprocessor — not the kind of machine you keep in your living room.

Programs are written and tested on the WICAT At a later stage, they are sent down communication lines for final testing in the 64 itself or any other home computer

Let's summarise. STAB-1 lets you write large programs which run fast and give you easy control over the hardware of the machine. Furthermore, STAB programs can be tuned so as to get the best trade-offs between space and speed, and it is easy to get the same program running on several different micros. It all sounds pretty useful. As we said earlier, STAB is not available to people who have got the Commodore 64. But this could change til there were enough demand!

Running speed

What about speed of execution? The most elegant and sophisticated language is useless if the programs it produces crawl along To explain how STAB programs manage to run so quickly, I'd like to begin by reminding you of the difference between interpretation and compilation

The Basic which comes with your Commodore 64 is interpretive This means that as you type in your program, it's put away in the memory character by character, with only a few concessions to speed like abbreviated keywords When you finally say RUN, the computer obeys your program statement by statement by viewing it every case it begins by analysing the command, working out what it means and making sure that there are no errors Only when the meaning is clear does the computer actually obey the command by adding numbers displaying a string or whatever it may be.

Despite the snail's pace, interpretation has huge advantages for

Compile or Interpret?

Which is best, interpretation or compilation? There is no simple

Forth (handwritten)

The Forth Dimension:
Programming with a DIY Language
Part 4 — all about structures
by Richard G Hunt

In the previous articles in this series I have discussed briefly one of Forth's most useful structural words [DO...LOOP]. Together with [IF...ELSE...THEN] and [BEGIN] these words are the cement that binds the building blocks to provide style and form. Without them, to extend the metaphor, Forth is a house of straw!

Structure is important in any language, not least Forth. Structured programming — simplistically a basic phrase for thinking it out and getting it right first time — is imposed on the Forth programmer by the language. There are three very elementary rules of structured programming:

● Each operation is sequential

● Conditional selection allows branching according to the state of conditional flags — execution of xxx always conditional to true, yyy if false, and zzz after xxx.

● Repetitive operations executes xxx continually until or while a condition yyyy is true, when execution proceeds to zzz.

Rule 1 is supported by any system and Rules 2 and 3 about suitable structural commands in the programming language. This is how they apply to Forth:

IF...ELSE...THEN

The full syntax of the Forth conditional is: (Condition) IF (execute true words) ELSE (execute false words) THEN (continue). As with most languages the ELSE part is optional. If it is of course the stack that causes the action of the components. A value for comparison must be on the stack last but comparison to take place. Consider the following

```
: GETANS   ."DO YOU WANT
           ANOTHER GAME?
           (Y/N)"
           KEY 89 = IF
           STARTPROG ELSE
           QUIT THEN ;
```

The word expects ASCII 89 ("Y") to be pressed in order to call the

word that runs the game, otherwise QUIT is called which returns control to the keyboard. Note that any value other than "Y" ends the game, thus capturing wrong keystrokes. The dyadic (that means a set of two) relational operator '=' takes two values from the stack and leaves a flag which is '[1]' if the condition is true or '0' if false. IF takes the flag and causes branching to the appropriate code depending on which flag is present. It follows that IF can be used only within a colon definition. (The applies equally to DO and BEGIN below) The IF structure is a language and powerful statement. It is possible to nest IF's like this

```
: MENU (input from keyboard)
  1 = IF prog1 else
  2 = IF prog2 alas
  3 = IF prog3 alas
  4 = IF prog4  else quit!
  then
  then
  then
  then ;
```

This is possibly not as neat as a CASE structure (as in Pascal) but if you are like concerned, Forth supports other relative operators which work similarly

```
 [ < ] less than     [ > ] greater than
 [#=] end [0 < ] both compare
        with 0
```

Other operators seemingly missing must be defined:

```
: NOT 0 =  ;  (reverses truth of
               flag)
1 < >  =  not  ;
1 < =  >  not  ;
1 > =  <  not  ;
1 0 > =  0 <  not  ;
```

The DO...LOOP

This is perhaps the most common of Forth's repetitive structures. I have hinted at how it works in an earlier article and since an example is an excellent teacher, here are some ways to use DO...LOOP.

```
: TEST  cr 8  1 do 8 1 do i ." 3
  loop cr loop ;
: 3TEST  cr 8 1 do 8 1 do i ." 1 *
  4 ; loop cr loop ;
: 3TEST  cr 8 1 do 8 1 do i ." 1 " ] i
  " 4 . ; loop cr loop ;
: 4TEST  cr 5 1 do 5 1 do j 1
  dup " 5 .r loop cr loop ;
```

These are examples of how to create vectors and matrices in a very structured way. It cannot compare with the compactness of more advanced languages, but with care it can cater for most normal requirements. And few would deny that j's also much more readable! The j loop limits have vanish variables has the Vic's 22-column screen and may be made larger for the 64. Try to work out what each example does below you entry it, remembering that 'j' limits the loop counters from the top of the inner stack, and 'j' the next inner loop counter from the second position on the return stack. Finally on DO loops it is possible to force a premature end by using LEAVE, once a given condition is filled

The BEGIN structure

This structure has several possible forms which allows great flexibility:

● BEGIN (execute Forth words true condition) UNTIL

● BEGIN (true condition) WHILE (execute Forth words) REPEAT

● BEGIN (execute Forth words) AGAIN

The first option allows the choice of determining branches out of a loop at a given circumstance, but is when a specific condition becomes true. In a game, a BEGIN loop may determine the continuous running of the program at the highest level

```
: RUN BEGIN PLAY DEAD
  UNTIL ;
```

PLAY would invoke all the lower level words that make the game, while DEAD would keep track of the score or number of lives used and so on. Now try this example. You'll see that 'TERMINAL lasts for the RUN/ STOP key.

```
: STEST BEGIN ."HELLO"
  ?TERMINAL UNTIL ;
```

The second option allows the reverse condition to be determined. In this case the loop repeats (at REPEAT) as long as the condition remains true, or conversely when the condition becomes false. As a theoretical example this form could be used to count loops and repeat while, say, the count was less than a given number

```
: STEST BEGIN ?TERMINAL
  NOT WHILE ."HELLO"
  REPEAT ;
```

The last phrase permits continuous looping unless this word's QUIT or ABORT are met. Try using this

```
: 7TEST BEGIN ."HELLO"
  ?TERMINAL IF QUIT THEN
  AGAIN ;
```

The next article will cover mainly input of numbers and strings and will conclude with a little exercise to prioritise, what I have preached these last few months.

Now that we've all broken into our piggy banks to buy our nearest and dearest even more spectacular Christmas presents than last year ardent Adventurers will be keen to revive those flagging savings What better than to solve an adventure and win a fortune into the bargain? You could win £25,000 by solving Eureka! or win a diamond by cracking the secret of Commodore's new Secret of the Stones .

I have a suspicion that there are software snobs in just the same way as there are those cinema freaks who talk about film — and then, only if it can be viewed in a 20-seat art theatre and portrays black and-white documentaries of the peasant struggle in nineteenth century Albania, (with Danish subtitles).

They are probably more numerous among adventure gamers, too. They're up until three in the morning waiting for just one turn at Mud and strongly hold the view that Philip Mitchell should be canonised (if such a thing is possible in the case of an Australian – let alone advisable).

They keep meticulous notes and maps, of all the adventures they play. To use HELP even once is to risk immediate excommunication from this elfin elite.

And when it comes to buying new software, they're even more critical and cynical than the sub-teens I see scanning the racks in W H Smith on a Saturday morning. They are especially wary of the hyped title — much preferring the single-figure camaraderie of a game that only seven other people will ever buy. But are they always right to be so-featured in the face of pizzas?

Eureka! is a case in point. Wasn't there a danger that the clever teaser ads followed by enticing full-colour pages of clout and the promise of a £25,000 prize would be seen as a little too slick, a mite too glossy, for the game itself to be

Eureka – good adventure or just good hype?

taken seriously? After all, there are always the headmaster of Imagine and Rabbit to remind us of what happens when software advertising is consistently better than the products it promotes.

But in the case of Eureka! at least, any such suspicions must be quickly dispelled. Its pedigree helps. This 250K text and graphics skirmish with prehistoric Europe, Roman Italy, Celtic Britain, war-torn Germany and the modern-day Caribbean is the work of Ian Livingstone and the talented Hungarians in Andromeda's

stable who brought such a refreshing look to games like Caesar The Cat.

Given that the prize element is obviously important, reviewers were provided, at most, with only two of the five sections which comprise the game – and I wouldn't he at all surprised if even those didn't vary in some subtle respects from the public versions. Also unavailable at the time was the colourful booklet containing additional riddles and illustrations and which offers more clues to discovering the phone number that you must be the first to ring

to claim that £25,000

Even so, the sample more than testifies to the quality and excellence of Eureka! Putting to one side the prospect of a glittering prize – because the game must surely be judged on its intrinsic merits – Eureka! is well-furnished with challenges which are sometimes encouragingly easy – at other times, very testing

But responses are fast and logical, and so even if your progress is brought to an abrupt halt in the path of a runaway horse or in the hull of a sinking slave ship, you should be able to figure out where you went wrong and be back on the track (or lava path, or Appian Way, or wherever) fairly soon.

The graphics are a stroke of near-genius. Instead of using hi-res screens with text windows (with all the attendant limitations), the Andromeda team have used multicoloured and multi-layered graphics to create smaller but brilliantly coloured and highly-detailed pictures which can thus be stored, displayed and changed almost instantly.

Many incorporate animated elements to add extra interest. The overall enjoyment is heightened by full use of the 64's sound potential. The marvellously strident music in this epicx in which Victor Mature used to fight a lion with one hand and a gladiator with the

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Adventure

other while saving most of his energy for Gina Lollobrigida. So Eureka! is that rare thing – a huge hyped game that actually does live up to the promises of its advertising.

A spy from beyond

Those of us old enough to have been young enough (if you know what I mean) to be anarchic, even before the era of Monty Python, will greet with nostalgic delight the news that Antonia Prohias's duelling, wedge-nosed secret agents from the pages of Mad are to feature in Spy vs Spy from Beyond Software.

I had my wrists slapped by Beyond's Clive Bailey for daring to suggest that it might be categorised as an arcade adventure; it is an 'animated cartoon strategy game'... I think he said. And as with that other wall-known game of strategy, two can play, it should keep the joystick manufacturers happy anyway.

What do you do for an encore with one mega hit under your belt? You don't necessarily let another vein of gold the second time around – as Melbourne House discovered after The Hobbit. Success came to that title have been adequate but hardly outstanding. Then again, you don't hack out that quality of program over a long weekend, and indeed it is almost wondrous that Philip Mitchell has polished off Sherlock as quickly as he has

Sherlock homes in

Sherlock is almost a pure text adventure, though there are some graphics along the way. The real appeal of the game is the intelligence of the parser routines, which build on the facility for third-person communication and inter-action first seen in The Hobbit to an extent that will impress even Zorkists. Incidentally, it used to be only Infocom who were any good at producing supporting documentation; indeed, but the 18-page booklet that comes with Sherlock improves even on that standard.

By the way, don't make the mistake (as a friend did) of putting to one side the timetables and other scraps which come with the game, thinking them to

be only amusing makeweights. If you're on the right lines (Just! Just!) you should find a use for them all.

Players of Aztec Tomb from Aligata can testify to the fact that the early effort by Tony Crowther gave little hint of his latent talents, which were to eventually surface in Loco and Suicide Express. Pretty brave of Aligata, then, to use the title Aztec Tomb Revisited (£7.95, £11.95 disk) for their latest adventure. Even more courageous, perhaps, of Mr Micro to promise a new graphic adventure every fortnight on Commodore, Commie and Vic soon. The games will be linked, and users will be able to download them onto disk from the Software Park pages. Meanwhile

Eureka – travel through time to win £25,000

Commodores are also said to like the idea of adding a multi-player, interactive game as a Computext rival to Mud – originally run on Essex University's DEC 10 computer and recently acquired by Century Communications for relaunch later this year

Two adventures of very different calibre are included in Select One – the compilation cassette of 12 games for the £6 selling at £12.49. Sadly, Ring of Power, originally published by Quicksilva at £2.95, has about as much appeal as a day-old pot noodle. It is supposed to be a graphic adventure, but all you see are crudely sprite representations of various objects or, if you type PICTURE (though the original may never have told you this), you can call up a view of three walls marked with N, S, E or W to indicate legitimate exits. I legitimately exited after only a few minutes of disbelief.

Denis the micro-menace

Denis Through The Looking Glass is something else again, a Quill-generated text adventure in which the PM's Hubby must travel everyone and everything in the way of satisfy-

ing his legendary (?) propensity for a quick snorter. It is immensely entertaining and almost compensates for the inadequacies of its bedfellow in this collection. Or you can buy it separately from Applications Software at £5.50.

The brace of new graphic adventures from Audiogenic at £9.95 are – if you'll pardon the extended metaphor – a bit of a curate's egg. In Time Traveller, you're off to wrest the magic hourglass from the evil Graf von unpronounceable with the assistance of 1990s technology (which is like 1980s technology – only the guarantee has run out). In The Magic Stone, the scenario has you searching for the all-night alchemist and the means of remuneration for the computer literate which marks Commodore's first substantial original title in the genre. For your £14.95 you get a large-format book packed with full-colour illustrations, in which author John Worsley tells the tale of a life tune in diamonds hidden on the Isle of Wight. By reading the book and studying the illustrations, and by exploring the 21 locations-cum-games which feature in the accompanying software, you should be on your way to discovering and claiming one or more of the 40 diamond talismen offered as prizes – and possibly the even more valuable Great Wight Eye.

Better still, Commodore have established a royalty fund which will grow by 50p with every copy of the game purchased. So successful claimants not only get to keep the diamonds but will have at least one share out of the 50 available in the fund's kitty when it closes. That will be when all 41 talismen have been claimed, when the fund has reached £1 million, or in December 1993 – whichever happens first

All clever stuff – and very fair, too; especially since you can claim by post and don't actually have to dig up the treasures. But for a concept that aspires to Williamesque sophistication – and certainly has an up-market price tag – Spirit falls a little flat when it comes to the games element. Co-author Ian Gray seems more at home with graphic adventures, such as his goodly Heroes of Karn, than with the tedious and samey arcaders he's devised here. They're a little too difficult for the younger player and probably rather too trite for the conventional adventurer to bother mastering

Yet I've played (worse still, bought!) poorer efforts, and its two-score chances of winning a rock plus a share of perhaps £1 million might just give Spirit a place in the charts that it wouldn't otherwise deserve.

And finally, since characters form the past have figured pretty strongly in this month's column, can you deduce what (or who) Sherlock Holmes and the Goons had in common? First correct answer out of the hat – on a post-card, please, by Friday, 1st February – wins a mint fastload cassette of Storm Warrior – Frost Runner's feature-packed 12-screen arcade adventure and a classic of its type.

Spirit of Commodore

Prizes of even more sparkle are your incentive in Spirit of The Stones, a kind of Mas-

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ACCOUNTING FOR YOUR SINS

A layman's encounter with Commodore 64 accounts software

by Karl Dallas

Most owners of small businesses or the self-employed shudder at the very thought of accounts; producing them is probably the most loathed chore of the business year. It's now possible for businessmen to do their accounts properly and relatively cheaply with a Commodore 64 and appropriate software. And here lies the problem. If accounting jargon leaves you cold (and it does for most of us), learning to use that accounting software may be yet another problem to contend with. Karl Dallas finds out how Gemini's **Cashbook plus VAT,** *and Dialog's* **Transact** *and* **Invostat** *packages shape up to solving his financial problems.*

As a self-employed financial idiot, who got into computers mainly because I can't add two and two without getting the square root of minus one, the hardest chore of my year is the preparation of my accounts. And since HM Government devised that kind of torture known as Value Added Tax, it's become a quarterly problem, too.

In fact, when I bought my first 8K Pet back in the Seventies, I must confess that it was financial number crunching I had in mind rather than word processing, spreadsheets and databases which is what keeps it busiest now.

I've looked at some of the really powerful business packages, and they terrify me mightily. But, frankly, the manuals assume so much prior knowledge of accountancy jargon (did you know Aged Debtors aren't really old aged pensioners?) and the procedures of single entry journal transactions, whereby cash received may be entered as credit to the sales account, but a debit to the cash ac-

count, making the whole thing harder to understand than even reverse Polish notation, that they frighten me right away.

Until now, therefore, I've been doing my accounts on a spreadsheet. Every item is entered, its VAT calculated, and at the end of the month I've got a complete summary of what's been going on from which my accountant can prepare something the Inland Revenue and HM Customs and Excise will find acceptable.

With the increased use of low-priced but powerful machines like the 64, however, it's become possible for businessmen to get into doing their own accounts properly. And the software doesn't cost hundreds of pounds, any more, either.

So I approached the accounts packages from Gemini and Dialog in ignorance and with trepidation, and though I ended up preferring one to the other, I won't be surprised if the professionals

say I'm wrong. My fellow financial idiots may agree with me, however.

Installation

Both programs are available on disk or tape, and of course the disk version is quicker to LOAD. Gemini charge £5 extra for the disk version of their **Cashbook and VAT** package, costing £84.95. I had them on disk, but Gemini's manual says their program takes about eight minutes to LOAD from tape.

The Gemini program doesn't include an invoice generator, but it does have a special VAT utility, VAT file, aimed specifically at people who are on the special retailers' scheme. This would become very valuable if, as seems possible, the Government starts to levy different rates of VAT for different products.

On the other hand, Dialog's bookkeeping system is called Transact. It costs £30 on disk, and you can pay £30 extra for the accompanying Invostat in-

GEMINI ACCOUNTS
CBM 64 Cashbook (c) 1984
By P.S. Meherne, MIAP

TRANSACT
BOOK-KEEPING SYSTEM
DIALOG SOFTWARE
REPORT DATE [   ] : [   ]

voice and statement generator. I have my own invoice forms stored on disk as word processed pages, so I could live without the invoice generator, especially since it doesn't integrate with Transact.

I have this dream of one day typing in one set of information where I pay out for something or (more rarely) receive a payment, and have all the rest of the work done for me, but that day hasn't come yet.

Obviously, if you don't need Invostat, then just buying Dialog's Transact package could save you a lot of money

Comparisons

When you start running the Gemini program, you're presented with a ready-for-matless] system into which you can start inputting data right away, with a very comprehensive list of 199 nominal account codes and duties, starting with Sales (1) and ending with Director's Loan Account. These names and codes can be changed, and there are just under 100 blank codes. If no titles are entered into these codes, then they are skipped while the system is running.

There is a set of codes for limited companies, and an alternative set for sole traders or partnerships. Obviously, both would not be required at the same time Gemini gives a useful list of the complete set of codes in the manual.

In comparison, Dialog offer only 90 codes (probably adequate for most small businesses), and the first ten are preset as 'control accounts' to monitor the bank, cash, debtors, creditors, output and input VAT, VAT clearance etc.

The rest you have to sort out by yourself. I must confess I found the Gemini list useful in helping me work out what I might need, but a few minutes' careful thought would probably help you work it out on your own.

Once you get into recording transactions, the distinctions between the two programs become obvious.

The Gemini program is much more tightly structured, with certain nominal codes restricted to receipts, others to payments, and some to both. On the other hand, I was amazed to find it didn't calculate the VAT on each individual transaction.

I asked the Gemini people about this, and David Perkins, who helped to devise it, told me that they had been advised to do it this way by the Customs, though they might have preferred to have included automatic calculation. The problem, of course, arises if you have a mixture of taxed and zero-rated sums, or if there is more than one rate.

Certainly, one of the reasons why I wear a wrist-watch calculator is so that I can always work out how to derive the tax from the gross sum (by dividing by 7.66667), since you ask), when I am sending out invoices, because my WP

program doesn't have a calculator, either. It's a little irritating, but I can live with it. Dialog, however, does give you the option of automatic VAT calculation.

After transactions have been completed, and verified, they are SAVEd to disk or tape as data files. Both programs have specimen files on disk but of course in practice you would SAVE new files to a newly-formatted disk as soon as you started working the system.

Gemini point out, rather alarmingly, that if you should overwrite the data on the program disk, it'll be impossible to run the program. I tried backing it up (I always try backing up my program disks, even though it varies widely on the 64), but it didn't work. Oh for the days of dongles!

One of the things I preferred about the Dialog program was that it came with a small demonstration data file, which enables the first time user to check out how it works. Gemini claimed that their data file could also be used for demo purposes, but there was no documentation about how this could be done.

Printing

Dialog provide no information on printer configurations, and there is no facility for setting up any printer. On the other hand, printing is well documented by Gemini, who specify an 80-column printer and have a 'configure' option allowing the page length, discontinuous paging, ASCII code for the £ sign, and device number to be altered.

The name of the company is defined while configuring the printer, perhaps surprisingly, though of course it could be incorporated in the data file name, eg "Anycompanydata".

Several options require the printer to be attached, and in fact Gemini assures a hard copy print out before shut-down (a good practice). Dialog was very unforgiving if you chose a print option by mistake without having the printer connected and will END with a 'device not present' error.

Typing CONT gives a 'Can't continue' error, and if you GOTO 0 (the ML routine opening call), the program will run again, but you've lost all the data in memory.

In fact, Gemini advise keeping the printer connected and turned on before you even RUN the program. If an interface, Interpod for example, is connected, then that should be configured before the program is RUN.

Gemini's nominal account summary

Monthly expense summary on Gemini

Documentation

Neither program is particularly well documented. Both have A5 booklets, the Gemini of 24 pages, the Dialog of 20.

The manual for Gemini's 'VAT file' says specifically that "this package is not intended to be a guide to the workings of Value Added Tax" and I'd say that a careful browse through any standard book-keeping tutor would be necessary to enable you to get the most out of either system. Finally, both manuals have ex-

FOR	Gemini: powerful, limited printer configuration possible
AGAINST	Gemini: no automatic calculation of VAT on each transaction
FOR	Dialog: easy for the beginner to get started
AGAINST	Dialog: less powerful, no printer documentation

Conclusions

In plumping for the Dialog package, you may realise that I have some fears that, in the long run, and after I've studied the requisite replies from my local library, I might wish I'd chosen the Gemini.

It's unlikely that you'd be able to use the same data file format, if you did decide to upgrade. But I'm still going to stick to my instinct.

Even if I'm right in suspecting that more careful study of the Gemini package would be well worth while, life's too short. I'm not an accountant, after all, and while I'm still hoping for that elusive pot of gold at the end of the next rainbow, I'm fairly confident that I'm hardly likely to see my business expanding so much and so fast that Transact would act as a brake on further development.

But if you're starting up, have big expansion plans, and have the time to get things right first time, then take a look at Gemini. It may cost twice the money, but I suspect that it's worth it, in the long run.

Cashbook Accounting
£59.95 (tape) £64.95 (disk)
Gemini Marketing
18a Littleham Road
Exmouth, Devon

Transact
£30 (tape or disk)
Dialog Software
293 Coppenhall
Limes Farm Estate
Chigwell, Essex

Invoicit
£30 (tape or disk)
Dialog Software
293 Coppenhall
Limes Farm Estate
Chigwell, Essex

Accounts summary on Transact

Write away

Adventure nut

I am writing to you from Sydney, Australia. I am a regular reader of your excellent magazine and I have found it very helpful in assisting me to learn more about my Commodore 64. Even though the advertisements aren't any good over here, I still love to read the articles and programs.

I am a crazed adventure game addict and currently have two games that I am hopelessly stuck on. Perhaps you or some of your readers could give me some help. The first one is "Heroes of Karn". How in heaven's name does one kill the pirate, and what will kill or disable the serpent? Secondly, in "The Secret of Kastron Manor", I'm in the stone cell and can go no further. Help!

M Stuckey, 60J Maramops Street, Marayong 2148, NSW, Australia.

Can any Karn or Secret solvers put this Antipodean Adventurer on the right track?

ZX Printerface tip

I am sure that some Vic users have the Softex Computers interface which connects the Vic-20 to the ZX printer and would welcome some information regarding it.

Whilst writing a machine-code screen dump for the set-up, I discovered that the Printerface software uses locations 351 and 354 while printing. Thus, I had to find some other zero-page locations for my program to use. I have found that locations 97-100 and 105-110 can be used temporarily.

Also ZX printer users will have noticed that, sometimes, the device will print illegibly. This has a very simple cure. Just feed some paper through before doing any printing and after leaving any paper off.

M J Davies, The Waverley, 79 Khosasara Street, Llandeilo, Dyfed, Wales.

Teach-yourself Victuals

First off may I point out that I'm rather new to the world of computers and I'm still finding my way around the programs. However I must point out that your magazine is just what's wanted for someone starting up with computers.

It's not full of very advanced programs, nor over filled with advertisements (as some magazines are), it gives us a very good magazine that covers a wide slice of computing.

I have now found the one magazine I want out of the hundreds that find their way on to the

newsagents shelves. Commodore User is a must if you wish to get to grips with your 64 or Vic-20.

The only thing I would ask for is some small programs that are of an educational kind to be added to the library of all those fathers who utter the excuse, "It's for my children". Maths spelling, Highway-code, Green Cross code - anything as long as it's of use for the children.

If you have any readers out there that may be able to help I would like to hear from them. Keep up the good work.

L A Hutchings, PO Box 48, Derby DE5 6QP.

As you probably know, there's an increasing amount of good and cheap educational software now available for the Commodore 64 (we're reviewing a huge batch in this issue). We don't publish educational Victuals for the simple reason that we rarely receive any. It's up to you to write it and send it ...

Help for the handicapped

I enjoyed reading my first copy of Commodore User. Can I suggest that you allow one page for your magazine to tackle the problems of the mentally and physically handicapped Commodore user? There is a drastic need for up-to-date information in this highly specialised field, both from teachers of the mentally handicapped and parents, of which I am one.

My son is a 5½ years old Downs Syndrome child. He copes well with the Commodore keyboard, but finds that most games on the market are too sophisticated for him to master. He requires programs which build up very slowly as his thought patterns and reactions are slower.

I urgently require a list of suppliers of suitable software. Can you help? Looking forward to hearing from you.

H Forsyth, 10 Balgibbon Drive, Callander, Perthshire FK12 8EU.

Worthwhile suggestions of this kind are always welcome. Trouble is, we don't really know how many mentally or physically handicapped Commodore computers there are out there. We need you to write in and tell us. Meanwhile, can any software suppliers offer any suggestions to Helen Forsyth?

Send your letters to: Write Away, Commodore User, 30/32 Farringdon Lane, London EC1 3AU.

Having finished his Home Control series last month, Chris Durham has put away his soldering iron only to start wiring up his house. That sounds alarming, and it is. He's installed a burglar alarm that's controlled by either a Vic or Commodore 64. The system is called Sentinel, from Micro-Security, and you can install it yourself for just under £100. Not only that, it can also be used as the basis for controlling other devices.

It's a fair cop?

The Sentinel burglar alarm reviewed

Last month I briefly touched on the subject of home security when I covered possible uses for the Input board. Micro-Security, who hail from Hampshire, have gone a stage further and actually produced a system that lets you turn your Commodore 64 or Vic-20 into a burglar alarm, complete with window sensors, pressure mats, alarm bells and cables. It can also act as a control system, turning devices on and off at preset times.

Security system components

The complete Sentinel security system consists of the Sentinel interface unit, the control program on tape or disk, an external alarm with weatherproof enclosure, internal buzzer, ten magnetic contact switches, a pressure mat, a panic button, two junction boxes and 50m of cable plus clips, everything you need to set up your own burglar alarm system. The cost is £98.00 excl VAT, comparable to many similar self-contained alarm systems.

As with any DIY security system, the first thing to do is to install all the various components of the system, wiring up the windows and doors with the magnetic

contact switches, setting the pressure mat in front of valuable items or at a doorway and mounting the bell, buzzer and panic switch in the appropriate places.

The cables are then taken back to the two junction boxes which terminate all the circuits and allows neat cabling between the junction boxes and the Sentinel unit itself. The Sentinel connects the User-port of the computer using a ribbon cable, and also requires to be plugged into the mains for its power supply. The instructions are straightforward and exactly the same as for any DIY system.

It is the use of the supplied software that separates it from a stand-alone alarm system.

The security program

There are two modes, security and control. Although you can run the control mode on its own, the security mode incorporates both, so you can use Sentinel as an alarm system and as a control system. Unfortunately this is not made very clear in the instructions.

There are facilities to alter the parameters of the program, set the date and time and test the alarms, the parameters

are normally set to the values you require and then the program stores them on tape or disk. When you next run the system these values are loaded in for use so you don't have to alter them each time. This is very handy, but the one exception to all this is the date. This has to be entered each time you run either of the main options. Even if you haven't switched the machine off and wish to change from security to control, or just reset one of the parameters, you have to re-input the time and date again.

I am sure it would not have been difficult to have stored the date and use the computer clock to keep track of the time even between options. Although you don't change options that often, to keep typing the date/time spoilt the otherwise well thought out menu approach, where the function keys are used to select the options.

Sounding the alarm

In the security mode the interface unit monitors two input channels; these can be either normally closed (nc) circuits

such as the magnetic switches, or normally open (no) circuits such as pressure mats or IR (infra-red) detectors. LEDs on the front panel of the interface show the state of each channel.

When the system is activated an 'events log' is begun. This shows the time of activation and records all events on one of three devices; TV screen, tape or disk. You are allowed 30 seconds (which you can adjust as required) to leave the building after activation. From then on anyone opening a protected door or window will trigger the computer to start a 30 second countdown. At the end of this period (also adjustable) the alarms will sound for the period of time specified in the settings (default is 30 minutes), after which time the system de-activates itself.

The delay is to allow you to de-activate the system before the alarms go off when you enter the house again. There is also a night time mode which is designed for use when you are in the house and wish to protect yourself from forced entry. In this case there is no delay; as soon as a sensor is triggered the alarms go off. Likewise the panic switch, this will activate the alarms irrespective of the state of the program, provided the Sentinel interface is powered up. One good point is that the internal buzzer sounds if any protected windows or doors are open when you attempt to activate the system manually.

The control program

I found this slightly disappointing. There are four output channels which can be switched on or off at preset times. The settings are stored on tape or disk in the same way as the settings for the security system. You specify each of the on/off times for each channel, activate the system and it will then switch the channels as required (an LED on the front panel lights up when the channel is ON).

However, you can only specify one on/off period per 24 hours on each channel; 2 on/offs per 24 hours would be much more useful and give greater flexibility to the system.

Also I cannot handle mains control without additional components such as power relays or opto-isolated triacs. Micro-Security have said they intend to produce a mains interface and this will certainly make the system more useful, although it will also put up the price.

Although there is no way of combining the triggering of the security sensors and the switching on of the controlled output with the software it is possible to, via the two parts work simultaneously. Thus you can have lights being switched on in the house while you are away and the security system activated. This does not preclude you writing your own soft-

ware, of course, and you could devise your own control and input system; opening the front door could then turn on the kettle and the light rather than an ear-shattering alarm bell!

Drawbacks of the system

With any system which turns your computer into a dedicated controller of some sort you have to ask yourself a few relevant questions, how useful is it, does it do the job as well as a stand-alone system and is it worth the extra money?

Sentinel is let down in a number of areas firstly, the entire system is mains powered. This can be a major disadvantage for both a security system and a control system. One glitch in the power supply large enough to trip the computer and the whole thing switches off. The 30 second delay is also some time enough for the burglar to switch off the power at the mains, he doesn't have to search for the control interface first. Secondly, after being tripped, the security system de-activates itself. Thus if you are away for two weeks and somebody attempts a break-in two days after you leave, then even if it does re the house is totally unprotected from then on. Why doesn't the system reset itself, warning the neighbours/police h an re-secured the point of entry, and continue to monitor? (You could in fact modify the software to do this yourself)

Thirdly, the control system does nothing that couldn't be done equally well by a time-switch or two, with the advantage that the latter will not be affected by momentary interruptions in the power supply. Finally, here's an obvious point; while the computer is monitoring your burglar alarm system or controlling things, you can't use it for anything else.

Advantages of Sentinel

Having looked at the reasons why Sentinel is not ideal, what advantages does it offer? Well, as a burglar alarm system you would be using it at times when your were either out of the house or asleep, thus putting your computer to use at times when it would otherwise be lying idle The Sentinel unit gives you a total of

two input channels and six output channels; by writing your own software you could use it in a number of control applications in a more flexible manner than the supplied software permits.

It is possible to purchase the Sentinel interface without all the security hardware at a cost of £69.00 (excl VAT) thus saving £30 on items you may not want anyway. (The manuals do not show how to operate the Sentinel directly, but using the supplied software will provide all the information you need.)

Finally, using something like the Sentinel does allow you to computerise your home to a limited degree if that's what you want to experiment with. It cannot therefore be dismissed as unsuitable for any particular purpose since different people will buy it for different reasons.

Conclusions

Within the limitations of any system that Sentinel does what it says it will do, it provides both a security system and a control function. For someone who wants to experiment with computer control and do something useful with it at the same time, this is a well-made, easy to use system.

However, if you want a reliable burglar alarm to protect yourself and your property in a high risk area then you would be much better advised to invest in a stand-alone, battery backed up system which does nothing else except guard your house. Sentinel is too dependent on a reliable and uninterrupted mains power supply; providing battery backup for both the interface and the computer would make it very expensive.

Although the software as supplied is perfectly usable, it would benefit from some improvements; this will not be a problem for the person who wants to experiment anyway. Overall, a useful system if you are going to use it for more than just a straight burglar alarm.

TOMMY'S TIPS

Tommy is Commodore User's resident know-all. Each month he burrows through a mountain of readers' mail and emerges with a handful of choice queries. The result, before you, is a wadge of priceless information and indispensable advice. There's even the odd useful tip as well.

Dear Tommy, I am the owner of a Vic 20 and the Vic 1515 printer, both of which behave impeccably.

Last Christmas however I also bought a Commodore 64, but not before asking whether it was compatible with the Vic 1515. Yes, I was assured, there is no problem.

When, however, I linked the 64 to the printer, I found that the printer worked all right, but only if I asked it to print the simplest of instructions. With anything complicated it stopped at a different point on each occasion. As the printer still worked all right with the Vic-20, I assumed that there was something wrong with the 64, and my dealer kindly changed it. But the problem still persisted even with the new machine.

Persistent enquiries produced a magic phone number, which when I rang up I was told that the Vic 1515 is meant for the Vic-20 only. If I want to use it with the 64, before OPENing the logical file I must POKE 53265,11 to invalidate the screen, and after CLOSEing the logical file I must POKE 53265,27 to bring the screen back again. I have followed these instructions, and the printer has worked almost without problem.

Since then however I have scrutinised every item of literature I could find including "Commodore User", but I have never found this instruction about POKEing. Is there any reason for this – which means is there anything wrong with my equipment?

Thus is due to a timing problem on the 64. The Vic-20 peripherals, the 1540 and 1515 etc, all suffer from the same problem, the device goes out of step with the computer due to the increased work that the 64 has to do in keeping the screen up-to-date. That is the reason the 'new' 1541 disk and 1525 printer were produced, they both have new ROMs which take account of this timing problem. Even they are not completely immune, try using two 1541 disks together for example! Commodore offered a new ROM

(at a cost of £28) to owners of the 1540 drive who wanted to use it with the 64. To my knowledge they have not produced one for the 1515. Turning the screen off is not an elegant solution, but the only other one is to sell your 1515 and upgrade to a newer printer

Dear Tommy, I am very confused about an advert for the ZX Spectrum put in a Sunday magazine. In the advert it said "The Spectrum gives 41.5K of usable memory, more than another competitors such as Commodore 64 or BBC model B. So you can run bigger and better programs". I thought there was a mistake as the Commodore is 64K and the Spectrum is 48K. Please would you tell me if that is correct? I think a lot of other people will be confused and won't know which computer to buy.

This is a classic example of companies telling people only half the story. The advert is perfectly correct if you take the amount of memory available to Basic. The Spectrum has 41.5K while the Commodore 64 only has 38.5K. This is because there is a large area of memory reserved for cartridges and the operating system etc. However, this is not the whole story because you have to take into account the sort of programs you are going to be running.

For example, the 64 can have as much as 54K available for a machine code program, because the area reserved for the Basic

ROM etc can be switched out to make the memory available for use. The Spectrum cannot do this so a machine code program on the Spectrum is still limited to 41.5K.

In practice I doubt whether this is really going to be a problem unless you are going to be running some huge database programs where available memory starts to become important. I suggest you should look at what you can afford what software is available (does it do what you want?), is it easy to use and are the add ons available and reasonably priced. Come up with a shortlist of computers and then go through and by then in the shop. You will find this a much better method of deciding on a computer than seeing which machine has the biggest byte!

Dear Tommy, Help! I won a Vic-20 starter pack some months ago in a competition and it has since developed a fault. As the unit is less than twelve months old, no problem you might think, but as I have no receipt none of the dealers near me want to know, so I rang Commodore but they say I need proof of purchase CATCH 22!

I have now given up, I would like your advice as to the possible cause and possible cost (I know it's a lot to ask but I do have great faith in you).

The fault occurred while running a small game during which time the program appeared to crash locking up

the run/stop, restore etc. All this time the TV picture was showing. To clear the computer I switched off and on switching back on, the initial picture would not appear; the screen stays black and at the same time the CLR key be disabled completely. The fuse inside the Vic appears to be ok as the neon lamp glows when I switch on. Any ideas?

I am afraid your fault could be due to a number of things, some easy to trace and rectify and others much more difficult. To get it repaired to a Commodore dealer will probably cost around £25 since most dealers make a shipping/handling charge of around £7-£10. Why don't you write to the runner of the competition and get them to send you a letter confirming when you won the prize and then use that to try to get it repaired by Commodore. Failing that, there are a number of independent companies who repair computers. While I cannot recommend any particular one, some I haven't used them, Trident Enterprises advertise in Commodore User and charge £12.50 + parts, their phone number is 0753 48785

Dear Tommy, Could you please answer the following questions? I'm thinking of buying an Epson RX 80 F/T printer to use with my Commodore 64. Do I need any additional hardware or software besides the printer before I can use it?

Secondly, do you consider the Epson RX-80 F/T to be good for the price or have I made the wrong choice?

You will need a cable plus some form of interface to convert the Commodore output into the Commodore parallel interface format which the Epson printer uses. This can be either software interface which converts the Uses' port into a parallel printer port, or a hardware interface which plugs into either the serial port (like a normal Commodore printer) or into the User-port some even do conversions of the control characters to give readable strings instead of graphics characters.

Tommy's Tips

Prices range from about £24 for the Stack software interface to £90 for the Impex hardware interface. Other interfaces include the Vicsprint and Comprint at £50 and £52 respectively. All of these come with a suitable cable, but if you try any others check to ensure it does include a cable.

You will not go far wrong with an Epson printer. While there are similar and possibly cheaper machines available, Epson have a reputation for reliability. I use an Epson at home and at work enough said?

Dear Tommy, Have you any ideas on a small program, that will give me a list of eleven numbers, at random, where none of the numbers are the same in any one block of elevens?

I read with interest your tips on Commodore machines each month, my only comment being that there is not enough of them.

You need to declare an array of eleven elements and then store the random numbers as they are selected. It is then a simple matter of checking the numbers you have already got and rejecting the new number if it is the same. The following short program will give you eleven random numbers between 1 and 100 with no repeats (it will work equally well with numbers between 1 and 11).

```
10 DIM RN(11)
20 FOR A=1 TO 11
30 RN=INT(100*RND(1)) + 1:
   FLAG = 0
40 FOR B=1 TO A-1
50 IF RN(B)=RN THEN
   FLAG=B:B=A: REM IF
   REPEAT THEN SET FLAG
   AND END LOOP
60 NEXT B
70 IF FLAG=1 THEN 30: REM
   SELECT NEW NUMBER IF
   REPEAT
80 RN(A)=N: NEXT A
90 PRINT"---CR-"
100 FOR A=1 TO 11: PRINT
    RN(A): NEXT A
110 END
```

Dear Tommy, Can you explain how to do multiple sorts? For example, how to sort a group of approx 200 people into 6 categories, and then re-sort each category into Alpha/Num order without mixing the categories up again?

I hope you can resolve this query

Multiple sorts are best done using pointers. This means that instead of changing the order of the alphabetic strings, you change the order of the elements of an array that 'point to' the strings. The following short program will demonstrate this method

```
10 MAX=10: DIM
   CAT(6,MAX), NAMES (20)
20 FOR A=1 TO 6: FOR B=0
   TO MAX
30 CAT(A,B)=0: NEXT B,A:
   REM CLEAR ALL
   ELEMENTS OF ARRAY
40 FOR A=1 TO 20
50 READ NAMES(A)
60 C=VAL (RIGHTS
   (NAMES(A),1)): REM
   FIGURE AT END
   DETERMINES CATEGORY
70 IF CAT(C,0)=MAX THEN
   PRINT "OVERFLOW IN
   CATEGORY: C:GOTO 100
80 CAT(C,0)=CAT(C,0)+1:
   REM INCE NO OF
   POINTERS HELD
90 CAT(C,CAT(C,0))=A
100 NEXT A
110 REM LINES 110 TO 160
    ALLOWS YOU TO CHECK
    CATEGORIES ON SCREEN
120 INPUT"WHICH CAT";X
130 IF X=0 OR X>6 THEN
    END
140 FOR A=1 TO CAT(X,0)
150 PRINT NAMES(CAT(X,A))
160 NEXT A
170 GOTO 110
200 DATA FRED1, GEORGE3,
    ARTHUR3, MIKE2, SUE4,
    ANN5, WENDY4, KAY6,
    MARGE4, JULIE4
210 DATA BOB4, TOM3,
    CHRIS1, BERT2, JOHN2,
    MABLE5, FLO5, JENNY4,
    PAM6, JOSIE5
```

You now have six rows of numbers, each number referring to the corresponding string in NAMES by referring to the array as NAMES (CAT(X,Y)) you can now do a sort do any category, without mixing them up again, by changing the order of the numbers in the relevant row of CAT. The .Yth element of each row of CAT gives you the total number of elements in that category. If you wish to access the strings in a number of different categories like CAT. This will also be considerably faster than moving the strings about, since you will not suffer from the dreaded garbage collection

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TASK SET!

THE BUG STOPS HERE!

CAD CAM

CAD CAM

WARRIOR

commodore
64

£9·95